

ISSUES RELATED TO THE USE OF, AND EXPOSURE TO, VARIOUS CHEMICALS

HEARINGS BEFORE THE SUBCOMMITTEE ON TOXIC SUBSTANCES, ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT OF THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE ONE HUNDRED FIRST CONGRESS FIRST SESSION

MARCH 6, 1989
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ISSUES RELATED TO THE USE OF, AND EXPOSURE TO, VARIOUS CHEMICALS

MONDAY, MARCH 6, 1989

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:03 a.m., in room 216, Hart Senate Office Building, Hon. Harry Reid (chairman of the subcommittee) presiding.

Present: Senators Reid, Lieberman, and Warner.

OPENING STATEMENT OF HON. HARRY REID, U.S. SENATOR FROM THE STATE OF NEVADA

Senator REID. The committee will come to order.

Good morning. Each of you will hear testimony today that American citizens have had their health and their very lives destroyed by exposure to toxic composite materials. What do we mean by "destroyed"? We mean skin rashes, loss of memory, death through cancer, lung irritations, toxically induced irritability and mood changes, job disability, and other health and life-threatening problems.

There is the man adversely affected by chemicals in an aerospace manufacturing plant who is afraid to hug his son. The father is fearful the chemicals he works with might rub off on his son's skin, giving the young boy the same medical problems the father suffers from.

There is the young woman who has to wear protective gloves all the time because her contact dermatitis, brought on by chemical contamination, is so severe that her fingertips feel like they are literally falling off or being eaten away.

There is the woman who passed out due to chemical sensitivity while pumping gas, with the result that gasoline poured uncontrollably over the ground.

There are hundreds of other stories like these—stories of ordinary Americans like you and me who have apparently become victims of toxic chemical contamination. These people are our responsibility.

The purpose of this first subcommittee meeting is to get to the bottom of the problem. We will begin by exploring reports of aerospace industry workers' complaints based on exposure to substances associated with advanced composite materials.

Our mandate is to answer many perplexing, difficult questions. What illness and contamination is it that these witnesses and victims have in common? What are the long-term consequences of this toxic exposure? What could have been done differently under existing rules and legislation using knowledge and information available at the time to have anticipated and permitted these health problems? What can this committee do to toughen enforcement of existing rules and legislation? And what can it do to toughen future rules and legislation? What can be done to help the victims and reduce the suffering to which they have been subjected? What is the extent of the danger to the American public, at large, and many other people who might be potential victims? What are the economic and human consequences of this problem, both in terms of its continuing non-treatment and in terms of developing a coherent, compassionate strategy to solve the problem and relieve the suffering?

I have been asked on several occasions about my interest in chemical compounds, advanced aerospace manufacturing, and the welfare of workers outside the State of Nevada. Let me present some of my reasons for calling this hearing.

During the second world war, American shipyard workers turned out a ship a day—a feat that led to the demise of Nazi Germany. Besides their sweat and hard work, these patriotic men and women gave their health, as well. We did not know then about the devastating toll of working with asbestos. With a few more precautions we could have reduced the danger and harm to these citizens.

As a boy growing up in southern Nevada, only 90 miles from the Nevada test site, I remember joining my parents and brothers to witness the explosion of the above-ground thermonuclear devices that were set off for national security purposes. Troops and civilians were intentionally exposed to radiation. On occasion, because the desert wind carried atomic fall-out far beyond the test site, whole civilian towns were poisoned. I was lucky. The wind didn't blow the fall-out over Searchlight, my home town.

Other people, though, weren't so lucky. For example, in the tiny southern Utah town of Saint George, where the wind did carry the atomic fall-out, there are now extraordinarily high instances of leukemia and other cancers. With just a few more precautions we might have lessened the tragedy and health problems suffered by these victims.

Last May, in the town of Henderson, right outside Las Vegas, the world witnessed the explosion of Pacific Engineering and Production Company. The blast, triggered by chemicals inside the plant, demolished everything in its path, luckily killing only three people, but injuring more than 350.

A blue-ribbon panel studied the situation, and it included in a report:

The most unsettling fact we learned was that we have such a limited knowledge regarding the identification, location, utilization, and transportation of hazardous materials. With common sense and precautions that included the community's right to know about the hazardous materials near their homes, we might have prevented these deaths and these injuries.

The right to know about composite materials, their effects on health, and what precautions we might take to prevent needless suffering, torment, and disease is just one focus of today's hearing.

As a concept, the idea of composite materials is not new. Reinforcing one material with another for strength has been around a long time: the Egyptians mixed straw and mud to make stronger bricks; the Romans improved the durability of both brick and mortar using them in combination with concrete to form the arches, vaults, and domes that remain standing today throughout Europe.

Today at the forefront of modern composite technology is the aerospace industry, where advanced composite materials are widely used in civilian and military operations. Advanced composites are plastic-based compounds mixed with carbon, ceramics, or synthetic fibers. These materials are lightweight, strong, resistant to fire, and can be illusive to radar—properties that are particularly valuable to our defense industry and our national security.

Just before Thanksgiving, I viewed the unveiling of the stealth bomber in Palmdale, California. The roll-out of the super secret inter-continental bomber the size of an F-15 with 172-foot wing span was impressive. Built with advanced composite materials, the stealth absorbs radar waves rather than reflecting them back, making the plane virtually invisible to most radar installations.

This state-of-the-art aircraft will be an integral part of our military arsenal for at least the next 30 years. While Americans will not get a close look at the stealth bomber or rocket mortar missile components constructed with advanced composites, almost all of us will come into contact with composite materials in our cars, in our kitchen pots and pans, and in popular sporting equipment. Because they are lighter and stronger, advanced composites are expected to replace much of the metal use in automobiles and aircraft within the decade.

These impressive leaps in technology have made us a more productive society, but is it possible that advanced technology is also making us sick?

I intend to set a standard for these hearings. The work place should not be a test tube and company employees should not be guinea pigs. We cannot tolerate stone-age protections for space-age dangers. At the same time, we must do everything possible to maintain the current high standards of national security that come from extraordinary leaps forward in scientific research and available technology.

Today we begin a dialogue that includes testimony from affected workers, medical experts, representatives of the aerospace industry, union officials, and federal regulators. I sincerely appreciate their willingness to appear before a panel today and look forward to their remarks.

In World War II we glorified Rosie the Riveter. Forty years later we buried her because nobody had known about the dangers of asbestos contamination. History must not repeat itself in this particular instance. The employees of the aerospace industry protect us by the work they perform; we owe them the very same high level of protection.

Senator Warner.

OPENING STATEMENT OF HON. JOHN W. WARNER, U.S. SENATOR
FROM THE COMMONWEALTH OF VIRGINIA

Senator WARNER. Thank you, Mr. Chairman.

I'll just submit my statement for the record so that we can proceed to hear the witnesses.

We have to bear in mind, however, that these composite materials represent the cutting edge of technology, and it is that cutting edge that is enabling the aerospace industry to be the material contributor to trying to correct our negative trade balance world-wide.

As we proceed with this hearing, I'm sure you will join me and others in doing so with a note of caution. We don't want to scare people who are offering themselves as workers in this industry.

I have a feeling that perhaps the industry has done a little more than we are aware of to try to protect their workers, and I look forward to hearing from them today.

I also understand the Department of Defense has been most cooperative, and they will be forthcoming with their analysis of this problem.

Thank you, Mr. Chairman.

[Senator Warner's statement follows:]

OPENING STATEMENT OF HON. JOHN W. WARNER, U.S. SENATOR FROM THE
COMMONWEALTH OF VIRGINIA

Mr. Chairman, I think the use of composite materials in the aerospace industry is an important topic for us to discuss, and I commend you for your work in focusing the attention of the Congress on this matter.

As you know, the use of composite materials—not only in the aerospace industry but also in other industries from recreation to auto manufacturing—represents some of our "cutting-edge" technology.

As is often the case with new technology, new questions and concerns arise often as fast as old problems and concerns are resolved.

This is especially true in the case of the aerospace industry. In recent years, thanks largely to use of these materials, airplanes have gotten lighter as composites replaced heavier metal parts.

Similarly, safety standards have been raised largely due to the greater flame retardant ability of composites over materials which they replaced inside the cabin or cockpit of an aircraft.

Today we will hear from a series of witnesses who will describe, as I understand it, the problems which they have faced with the use of these materials.

We will also hear from a panel of physicians who will testify to the effect that the handling and use of these materials can have on human health. And I want to acknowledge the presence of one of my constituents, Dr. Robert Ballster from the Medical College of Virginia, who will testify on behalf of the American Psychological Association.

At this juncture, I will have to state my belief that the subcommittee has omitted an important witness from these proceedings. It would seem to me that Dr. Patricia Sparks, who chaired a panel to evaluate workers' medical conditions, should have been included. I note that in one of the subcommittee's letters of invitation, a witness was asked to comment on Dr. Sparks findings, yet Dr. Sparks is not here to present those findings.

We will also hear from representatives of the two companies where health and safety problems are alleged to have occurred. I can assure you that I will be very interested in hearing from those witnesses about the operations of their plants and their on-going compliance efforts with State and Federal health and safety laws.

I hope we will also hear from these witnesses how their companies treat complaints such as these when they arise from workers. I would hope, Mr. Chairman, that after these hearings are over we could describe some sort of model for those efforts, so that further congressional hearings won't be necessary in the future.

Finally, and importantly for this subcommittee, we will hear from the Environmental Protection Agency, the Occupational Safety and Health Administration, and

the U.S. Department of the Air Force, who will describe how widespread these problems are—if in fact they are widespread.

In closing, I want to offer a word of thanks to the Air Force, for the important work it is doing to enhance awareness of composites and their use. I like to think that U.S. Government agencies will be leaders in the safe, effective research development and use of new materials, and from what I have read this appears to be true.

Thank you, Mr. Chairman.

Senator REID. Senator Lieberman.

**OPENING STATEMENT OF HON. JOSEPH I. LIEBERMAN, U.S.
SENATOR FROM THE STATE OF CONNECTICUT**

Senator LIEBERMAN. Thank you.

Mr. Chairman, Senator Warner, ladies and gentlemen, I want first, Mr. Chairman, to congratulate you on convening these hearings. I am new here in the United States Senate, as you know. I served for 10 years as a State senator, and it always struck me that one of the most important capacities for a law maker to have is the willingness to listen and to respond and try to find out more when you hear something that agitates you. I think that is exactly what you have done here for the United States Senate.

You heard stories that bothered you, and you have responded by putting together this excellent hearing, which I hope will lead us not only to more knowledge, but perhaps to action.

Mr. Chairman, your opening statement took us back in history to the Greeks and the Romans, and it strikes me that what we are talking about here is something as old as our species—maybe, if you will allow me, it goes back as far as the Garden of Eden. We have intellect which distinguishes us from other species on this planet, and the question is how we use that intellect and whether we are able to control and guide the products of our higher intelligence.

In so many different ways, technology has brought us better lives. But it has also produced dangers which we too often find out about after we have become accustomed to those better lives.

Earlier this week my wife was probably one of millions who saw a show on television concerned about the effects of pesticides on fruit and fruit juices that are consumed, in large measure, by children. Being blessed with a one-year-old baby, my wife responded with anger, anxiety, and immediately removed apple juice and fruits from the baby's diet.

Here today we are dealing with another aspect of that same problem, which is the risk that workers may have inflicted upon them as a result of working in this high technology industry. I think it raises, again, the question that comes before this committee over and over again when we consider air pollution and water pollution and, in this case, toxics, which is: are we developing a world which will be full of technology but, as we turn it over to our children, will ultimately be unhealthy, unsafe, and, at worst, uninhabitable?

I think the only way we get answers to those questions that can lead us to take action to avoid the worst consequences of the direction in which we are going is to listen to people, and I applaud you today for not only bringing in those who are so-called experts in this field, but bringing in some of the people who have been direct-

ly affected in their own lives by the consequence of these composite materials.

I look forward to these hearings and then working with you to fashion an appropriate governmental response to the dangers involved.

Senator REID. Thank you, Senator Lieberman.

Senator Chafee, due to prior commitments, is unable to attend today's hearing. His statement will be made a part of the record at this point.

[The statement referred to follows:]

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

I would like to commend the distinguished chairman of this subcommittee, the Senator from Nevada, Senator Reid, for scheduling these hearings on a topic which is of great concern to everyone working in the aerospace industry.

The purpose of these hearings, as I understand it, is to come to some understanding of what is causing widespread worker illness in the aerospace industry, and to ascertain whether the Federal regulatory programs now in place are adequate to protect the health of workers in the industry. We do know that the advanced composites being produced by the aerospace industry utilize a number of chemicals such as phenol/formaldehyde, epoxy resins and solvents, which can have an adverse affect on human health.

What we do not know is whether there is something unique to the aerospace industry that would increase worker exposure to these chemicals, and whether additional steps must be taken to protect human health. Use of toxics in the workplace is increasing at an alarming rate, and there are some real questions regarding whether we have adequate scientific data on these substances to set safe exposure limits. Hopefully today's proceedings will shed some light on how we can prevent worker illness in this industry.

Again, Mr. Chairman, I commend you for scheduling these hearings, and I thank all the witnesses who have travelled here from California and Washington to testify. I look forward to an informative and productive hearing.

Senator WARNER. Mr. Chairman, if you would indulge me just for a minute, our colleague brought up that story about the apples. I heard it also on "60 Minutes," and it got my attention because I'm an apple grower. I have a small orchard and I was wondering if I was poisoning all the kids around town.

Then they put on a little correction last night. They said, first, that the number of apples sprayed with this was a minute fraction of what goes to market, and if you did consume the apples that were sprayed, you needed to ingest 1,000 pounds of apples a day before you would be affected by it.

So I would think that this is an example of how we strike out in these areas, but we ought to do it with some caution and understanding before we scare people. I think that program last week scared a lot of folks. We're gravitating toward the truth in that now.

Senator LIEBERMAN. Mr. Chairman, if I may just respond briefly? Senator Warner, I am a person who, for the last 20 years, has probably eaten between two and five apples a day.

Senator WARNER. Did you hear the correction last night?

Senator LIEBERMAN. I did not. I'm relieved to hear it.

But I think part of the concern here is the higher rate of ingestion by infants in relationship to their total body weight and the development of their natural immune systems that can deal with those pesticides.

Senator REID. Gentlemen, thank you very much.

Today we have 15 witnesses and we have received written statements from almost all of them. We are going to allow seven minutes for oral presentations. This timer will keep track as follows: At the end of six minutes you will see a yellow light come on. You have one more minute. When you see the red light, your time is up. All written statements will be included in the record in full.

Would the first panel of witnesses please step forward? Beth Gausman will be first, then Lori Liberty, Deborah Sutherland, Bonnie Faye Schrum, and Beverly McCormick.

[Witnesses sworn.]

There seems to be someone else at the table. Would you introduce yourself, please?

Mr. GORDON. I'm Randolph Gordon. I am the attorney for Beverly McCormick and Faye Schrum. I have spoken with your administrative assistant. I intend to simply help my clients to facilitate their expression of some of the disabilities they sustained that impair their ability to remember.

Senator REID. That will be fine. Thank you.

Ms. Gausman, please begin.

STATEMENT OF BETH GAUSMAN, PRESIDENT, CHEMICALLY INJURED UNITED COALITION, ENCINO, CA

Ms. GAUSMAN. I'd like to give the panel a packet of information. We have packets of information for each of the Senators.

My name is Beth Gausman. I am the president of the CIUC—the Chemically Injured United Coalition, the victims' rights group of which this panel are members.

I would certainly like to take the time to thank you, the committee members, for holding this all-important hearing. I will be handing you a packet of my information. I would like to ask the committee members to go over sections 7 and 8, particularly. It tells a little bit about our group and some legislation that we were able to help get passed in California regarding transportation toxics.

Also, in section 4, the CIUC recommends worker safety recommendations for possible guidelines to follow to prevent this type of tragic injury that has occurred to these workers here today.¹

Thank you.

Industry regulating industry. Industry guarding industry. The fox guarding the hen house.

Every worker has the right to work in a safe environment. These workers here today, and the other victims that are not present here, the workers in aerospace, the Lockheed workers, the Boeing workers, those that will be heard from in the field presentations in Burbank and in Boeing, Seattle, and Auburn, the other victims who are not here today were not aware of the dangers in the work place, they were not aware that with each punch of the time card a piece of their health was also being punched out.

Exposure to chemicals in the aerospace industry and in other industries causes long-term health effects, health effects that are life-changing. These individuals here suffer from respiratory problems,

¹ The information referred to has been retained in committee files.

skin eruptions, and hypersensitivities. They can become so sensitized to common, every-day household chemicals, and even their outside environment, that they must isolate themselves, they must go to remote areas.

These workers were not aware and they were not warned that chemical exposure would cause a breakdown in their immune systems, as the medical testimony will later provide. They were not warned that they would have problems for the rest of their lives.

This hypersensitivity can eventually cause the "boy in the bubble" phenomenon. Whether directly or indirectly exposed to these chemicals through poor ventilation, the phenomena can and does occur.

I have included in your packets, under section 2—you will notice a whole section of large photographs. This is the area in which a disabled McDonnell-Douglas employee must now live. It is a very remote area.

If you look at the next photo in your packet it is a work place. This work place does not have wood, it does not have a normal table there. This man has to isolate himself, and the exposure to plastics is so grand and so terrible that he is even sensitive to the vinyl in an eight-year-old car and cannot be around it. He has foil lining his office and his home.

I'd like to answer any question after my testimony about these.

I speak also for the faces that are not here today—the faces of people that work for the aerospace subcontractors and for the faces of the communities surrounding the aerospace plants. For years Lockheed Burbank has dumped chemicals into the water supply of Burbank, so the slogan goes, "While in Burbank, don't drink the water."

The fox guards the hen house. If the fox had turned his head, he would have noticed that the community hens were pecking at his tail.

In your packet, under section 3, I have included information regarding the exposure by a subcontractor who was emitting things into the atmosphere in metal plating—it is section 3 here. These are people that were hurt that lived in a nearby trailer park.

We feel strongly that the aerospace subcontractor needs to be included in the scope of this committee's safety recommendations.

Protection of the worker and the community should be a primary focus, yet every day we hear horrifying reports involving the transportation of toxics placing the community at risk. I personally worked hard to pass legislation involving safer transportation of toxics in California; however, I am sure that the public is not aware that even parcel vans are carrying highly toxic substances and acids on our highways every day.

The Los Angeles County Board of Supervisors has voted on a motion to limit toxic parcel transport. I urge this committee to recommend that the United States Department of Transportation limit parcel van transport of toxics.

The employee and the community depend on local state and federal safety agencies to protect their health and safety. NCAMP, the national coalition that the Senator mentioned regarding pesticides, this is the committee that oversees pesticide in the private sector. The National Coalition Against the Misuse of Pesticide reports that

Steven Schatzow, former head of the EPA Office of Pesticide Programs, left his post in 1986 to join the law firm of Morgan, Lewis, Baucas, and Baucas, where he represented Paramount Termite Control in a chlordane law suit.

The fox is guarding the hen house.

The system of checks and balances involving the employee safety agencies and local community has been recommended to this committee by the Chemically Injured United Coalition to better protect the health of the employee here in aerospace in the community.

Because the committee has asked me to provide my own personal toxic exposure, I would be happy to do so at this time, and there is a packet of information regarding this.

In the "L.A. Times" photo you will see the hazardous material team outside of a U.P.S. van. I was exposed three years ago when I stood near a United Parcel van which was carrying highly toxic acid. I inhaled it, I got it on my skin. I was carried by ambulance to the hospital. I was treated, given oxygen, hospitalized for three days. I didn't know how badly I was hurt. I didn't know how lucky I was.

The doctor was telling me how lucky I was not to be hurt more, but I didn't know that clean-up was——

Senator REID. Ms. Gausman, your time is up.

Ms. GAUSMAN. Excuse me. Thank you.

I'd be happy to answer any questions.

Senator REID. We're going to wait until we complete the testimony of all the witnesses on the panel, and then we will have some questions for you and the others.

Ms. GAUSMAN. Thank you very much.

Senator REID. I believe you have agreed on an order among you. Who is next?

Ms. GAUSMAN. Lori Liberty will now speak.

STATEMENT OF LORI LIBERTY, ENCINO, CA

Ms. LIBERTY. My name is Lori Liberty, and I'd like to thank you for inviting me here, and for the opportunity to speak.

Because I complained so long to management, I wasn't given any attention. I've been employed for Lockheed for nine and a half years, since 1979, and I have been poisoned by Lockheed chemicals. I'd like to tell you my experience.

I worked with many, many chemicals. MEK, for example, avcoat, MIBK, solvent sealants, LCM 40-2121, Herculein, and MSI.

As far as the storage of these chemicals, the MEK were in fifty-gallon drums. Some of these drums were not correctly sealed. When you would pump from the drum into the can using it, most of the chemicals would be splattering onto the floor and the person.

Senator REID. Could you tell me where you were and what you did?

Ms. LIBERTY. I worked for Lockheed, Burbank.

Senator REID. Okay.

Ms. LIBERTY. I've not been able work for almost two years now. I went back for one month and I had a seizure which was caused by the chemicals. This affected everything in my body. It's affected my speech. It has affected quite a bit of things in my whole system.

gers swell, and my nails fall off of my thumbs, and they go in as deep as into the finger itself.

This is the hardest thing that I've had to go through, but the ventilation in these buildings is another thing. The ventilations are improper. I mean, I'm not in a Department of Defense program, but I am in a place where they have a woman who has emphysema. They petty to her and they don't open the doors for the coldness. We need to breathe. There are not fans. There's nothing corrective in there to help these people breathe.

I would get headaches, and everyone else would get high or dizzy working with these chemicals. I never realized anything like anybody else.

I will never know what it's like to feel normal. I wish I had the chance to feel it. I can't even have a baby because of this. I'm too afraid. It says the chances of birth defects—I've already had—are five out of one hundred, and now I can't have a child because I'm not bringing it into the world knowing it can have birth defects, and everything else. There's no way. I'm thirty-three and I've had no kids or anything in my life. I love children. Like I've said, I love to work, and I can't work anymore.

Thank you.

Senator REID. Thank you Miss Liberty.

Senator WARNER. Mr. Chairman, this witness obviously has gone through a great bit of physical exertion to make possible her valuable testimony. Do you think she might be offered a minute or two more?

Do you have some additional testimony that you would like to provide?

Ms. LIBERTY. Yes sir.

As far as supplying you with the right equipment—the respirators. I was forced by Mr. Leon Fitzgerald to take a respirator across the way to medical and have them try and fit me into a respirator. This respirator had to be fit. He wanted for them to make sure I could wear it. I told them. I went over there. Medical said “You tell them to make it personally just for you, because you're going to have an opening at the top or at the bottom.” They threatened to fire me, and I filed against it with the union.

But none of their equipment—even girl's sleeves—they didn't give you appropriate full facial mask for the spattering of these chemicals, let alone the respirator. That doesn't mean it's covering the whole face.

The containers were very, very unsafe. The majority didn't have anything on them, or they'd have a skeleton head with the x through it, or they'd say MEK. Then they came out with new cans. But the other containers you had to premix, and I had to take safety of—like advcoat, for instance—off, safety cover off a plane. You have to dump MEK. Quite a bit of MEK. I mean enough to asphyxiate, you know, several people, in order to get it clean. And if you didn't get it right they always left a film on part of the plane. You'd have to go over it until you made sure that there was absolutely no film, whatsoever. That means spending an hour or two hours, maybe a whole day through the whole thing.

Senator REID. Thank you very much.

Next witness, Ms. Sutherland.

STATEMENT OF DEBORAH FORBES-SUTHERLAND, WESTLAKE
VILLAGE, CA

Ms. FORBES-SUTHERLAND. Thank you Mr. Chairman.

Sixteen years ago I started working at a job I loved—a job that afforded me the opportunity for personal growth and financial security. I had my own share of the American dream.

One year ago I lay dying. I watched as my husband cried out of pain and frustration because there was nothing he could do to help me. Each moment together could have been our last.

What does one have to do with the other? It was my job, my share of the American dream, that had become my murderer. Every day that I had gone to work I was exposed to chemicals with strange names, names like methyl-ethyl-ketone, benzene, isocyanate, toluene. These and dozens more just like them are major components of the epoxies, adhesives and solvents I sold to thousands of industries across America.

These chemicals go into to such diverse products as kitchen cabinet poles, jewelry, tennis rackets, furniture, automobiles, the space shuttle, and the Stealth bomber.

Companies with names like Lockheed, Boeing, IBM, Hughes Aircraft, and Northrop were among my customers. But companies big and small bought these chemicals every day, sometimes not knowing anything more than a part number. And every day, at least one customer would ask “are these products safe?” And I would answer, “Of course they are. Just don’t eat them on your breakfast cereal.”

Mr Chairman, Senators, I lied to those people. Not intentionally, because I really believed that those products were safe. After all, if they weren’t, wouldn’t you have been told they were dangerous? Wouldn’t there have been big warnings printed on all the labels and all the data sheets, not just merely the “keep away from children” tag that was placed there?

I come before this panel today representing thousands, perhaps hundreds of thousands, of American workers all across this great country of ours. Hard working people. The people who have built and keep this country the best in the world. The people who are the parents of our future. Many men and women who could not be here today, either because they are too ill, or they can’t afford the cost of such a trip, or who don’t know that they aren’t alone in their illnesses, and in their dying.

There are people who care about them. These are men and women losing their lives while earning their livelihoods, who are killed a little each day while working with these dangerous poisons.

I’d like you to imagine their deaths if you would, gentlemen. The killing starts small—a skin rash here and there, headaches building to a blinding intensity, memory loss and confusion, depression, respiratory difficulties, sexual dysfunctions, years lost off lives because of anemia, stroke, leukemia, and various cancers.

And even when these jobs don’t kill, when these injuries don’t ruin your lives physically, your whole life is changed anyway. You lose your job because you can’t work. You lose your home because you no longer have a job to pay for that home. You can’t get

needed medical care because you can't pay the doctor bills. America's profits are lost because of a drop in worker productivity. America's growth is slowed because of lost income and human potential.

I speak to you today of tragedy, but I also speak of hope; of a belief that, in my heart, America and her people can handle this problem, can overcome this crisis, and we can find the solutions.

It is technology that has brought about this tragedy—these deaths. It is technology that can save the lives of American workers as well. Together we can work with industry to find safe, non-hazardous substitute materials. Our defense contracts can demand safer, better products, and higher safety standards for their work. Together we can educate the American worker to use safer work methods, and to use the safety equipment that industry needs to provide. Together we can support the medical researchers in their quest for prevention, detection, and treatment programs for the chemically injured. Together we can work with regulatory agencies like EPA and OSHA in finding better testing procedures, and again, setting higher safety standards.

You, the members of this esteemed committee, can help by enacting a good legislation to better protect the American worker.

All of America can help by supporting the various groups around this country who are helping these workers find the medical and legal help they so desperately need. These groups are rising up to speak for the worker who has no voice. I was lucky. I was able to receive the medical care which saved my life a year ago. There are far too many others who aren't, or who won't be, as lucky.

We, the chemically injured, are not hysterics, and we're not malingerers, and we're not hypochondriacs. We have truly been injured. We are sick and we are dying. All we want is to be able to lead normal, healthy, and productive lives. And we ask your help.

Thank you, gentlemen.

Senator REID. You're certainly welcome.

Miss Schrum.

STATEMENT OF BONNIE FAYE SCHRUM, RENTON, WA

Ms. SCHRUM. My name is Bonnie Faye Schrum, and I'm a mother of three boys.

I'm an employee at Boeing. I've got roughly 10 years in at Boeing. I was a hard worker. I worked all the overtime I could get. I never had much going on at home so I was always glad to go to work, and would work for anybody else. When they didn't want to work overtime, I would work it. I got along well with my supervisors and I've never had a drug or alcohol problem.

They brought this phenolic material into the shop and things started happening right away. Immediately upon them bringing it in the people there started having problems. There were people passing out and vomiting all over the floor, vision problems, disorientation. It was like everybody was drunk. We laid these phenolic material up on tools, big tools. You just laid it on layer after layer. The more it was in there, the more people got sick, especially in the summer time.

I've seen it get up to one hundred and ten degrees in there. The most we ever had was four fans—two at one end of the shop and

two at the other end of the shop. I've seen people pass out just from heat alone.

One time we had a supervisor. We tried to get him to stop work because there were so many people so violently sick, and he said they couldn't stop it unless there were at least three people who had passed out in the shop. They were sending the people out to Medical, and they would pass out on the way to Medical. There were several people who passed out on the ground in the bushes along the way to Medical before they could reach medical—passed out from the heat.

You experience severe headaches—really severe headaches. I've seen girls sit in the restroom at work and press on their heads as hard as they could. It was like their heads were going to explode. Vomiting, just non-stop vomiting, weight loss, vision problems, dizziness, confusion.

You work in a place four or five years, and you think you know where the door is. When you're like that you can't even find the door. It's like being extremely drunk.

A lot of the girls were crying and begging and wanting somebody to do something, but there was nobody there to do anything. We were discouraged from reporting this to Medical. At one time there were twenty people who went to Medical and tried to get something done. All twenty got Medical restrictions. They came back to the shop and they were told that they would be fired. So all twenty had to go back to Medical and have those restrictions pulled so that they could work with this material.

At crew meetings they read, "If you went to medical,"—when we had our crew meetings they had a big chart, and everybody's name that had gone to Medical was up there on the board. It told why you went to Medical, and what the doctor decided to do with you.

Then, you had to put up with the people in the shop. Our area was—a lot of times we were put up for "crew of the quarter" or "crew of the month" and "crew of the year." That would mean we'd get a dinner or a jacket or whatever. But if you had too many people going to Medical, you couldn't get into this. If your name was up there when you had a crew meeting, after the crew meeting you really paid for it, because you had all the other employees on your back. You had knocked them out of a dinner, or you had knocked them out of a jacket.

I'm not the same person I was five years ago. I used to be very energetic. I always had something going on. There was never a time when I didn't have some kind of a project going on, doing something. But that's not the case anymore. I can't pump my own gas. I can't go out in the traffic. I have vision problems. I can't go to the grocery store without getting sick.

My kids, who are early twenties, don't understand what's happening to me. I can't sleep at night. You can't eat. You have no energy. I mean, there are days when it's all I can do to crawl from the bed to the couch, so that I don't have to lay in bed all day. You do dumb things. You take all the precautions in the world, but it doesn't—it still happens.

One example: I was going to the doctor—this was last summer—and my car had been parked outside, and I had a sunshade in the windshield. I don't know how I did it, but I forgot to take the sun-

shade out of the windshield, and left to go to the doctor. Everybody was honking their horns, and pointing and hollering at me, but I did not know—I did not know why they were doing this. I couldn't—I just couldn't make the connection to understand what they were talking about.

Finally I stopped and got out and went around the car to try to determine what was wrong. A guy stopped and said, "Hey, lady, you can't be driving around with that sunshade in the window." That's when it hit me. You just can't make these connections.

There are days when I don't even know if I'm in my own home.

I had to give up the driving. I don't go out unless someone takes me. You just cannot do anything.

We're here today to see if we can't get some help from somebody. I've gone to the union. The union didn't give us any help. I even applied to the union to get funding to come back here. And Boeing didn't give us any help, either. I asked them also.

Senator REID. Thank you very much for your testimony.

Ms. McCormick.

STATEMENT OF BEVERLY McCORMICK

Ms. McCORMICK. Yes sir. Thank you.

My name is Ms. McCormick. I'm a single mother of four children. I've been a Boeing employee for four years. I was a very dedicated worker. I have an excellent record.

What happened to me was, I came to work in the 1702 building in the fall of 1987. I noticed when I first came into the building the filth, the no air, no ventilation, whatsoever. I could—I had a hard time breathing. I asked supervision a number of times if we could get air in this building. They had windows up in the ceiling that they had flat refused to open. They said security, although we couldn't figure out why.

My problems—my health problems started in the fall. I noticed with the headaches. I had started having severe stomach problems, diarrhea, vomiting. We were extremely busy, working a lot of overtime and I didn't know what was happening to me.

As time went on, in the early spring I developed what I thought was a really bad flu, and I was down in bed, I think it was about nine days. I lost a lot of weight, but I got so bad that a friend of mine that was with me at the time called the hospital, because I thought I was going to die. I couldn't even get to the bathroom without crawling.

When I finally got better I came back to work. I was only in the building about fifteen minutes, with my supervisor and my lead in the office, and when I came out of the office into the shop area I started staggering and was falling into everything. My supervisor made me go home again—told me that I had this flu again. I went home.

I was home ill again for another four or five days. I'm not really sure there. I came back to work again and I started again with the headaches, severe. The stomach—I still had the stomach problems. One morning I got up and I was bleeding from my kidneys. I came to work and I told my lead I was very nervous and upset. I said I had to get ahold of my doctor immediately when she opens. I forgot

about it—completely lost—lost it all. I can't remember exactly when, it was days later I started breaking out in these hives. Like, we were working a lot of overtime and I thought it was just, maybe, a stress thing. It got so bad, I remember it was on a Friday, and my boss came up to me and asked me if I'd be able to show up for work on Saturday and Sunday. And I was getting so upset over these hives. They were itching me to death, swelling, my joints were swelling. I said, no, I'm not going to come in tomorrow. And he asked me if I'd please get there on Sunday.

That evening I ended up at the hospital in the Emergency. And the Emergency doctor told me that I'd come in contact with something I was very allergic to. And, I—I just couldn't relate any of this to the material that was in the shop, and other people were suffering this vomiting and hives and so on. And so I kept thinking it was just stress, and he gave me some shots to take it off my skin, and a lot of medication to take.

The medication lasted for two, three weeks maybe. And then it started all over again. I was still having the bad headaches, and I would go in the bathroom to get some relief, throwing cold water in my face. There would be ladies in there just literally sliding down the wall. They were so sick and vomiting. And I tried to talk to them and tried to get them to Medical. And they were afraid. They wouldn't go. They were needed on their jobs and were told that this material wouldn't harm them.

And then I went—it was about—I think it was almost a month, and I got these hives extremely bad again, and this time I lasted until about 10:30 in the morning, until my joints started swelling so severely that I could hardly walk. And I was showing some of the people in the shop, and I made an emergency trip to my doctor's office. And when I got there, she couldn't believe that I even walked in that building. I was so swollen and deformed looking. And I found out that there was a doctor that could give me a test for chemical exposure.

I had this test done and it showed that I had a high level of formaldehyde in my system. And I still tried to go back to work again, and my supervisor put me at the other end of the building, thinking that I'd have more air at that end of the building. And I lasted for four days down there, but I could not function.

I mentally—I couldn't think. I wandered around. And on the fourth day I started breaking out in these hives again. And it—I got so bad that finally in July of last year I had to be taken off the job because I couldn't function. I was—during this time back in the spring when I was so bad, I was driving down the highway that I take to work every day, and I got lost. I was in panic, and I started screaming. I had no idea where I was.

I've had to give up my golf. I got into golfing and the bowling league. I was doing very well. I took a first place. I can no longer golf. I haven't got any energy. I've had to take all chemicals out of my home. I can't even do my own housework any longer.

During this time, I want to also mention, they was some testing for this air quality in this building. I was in this building when other fans were brought down into this particular area, station four. This area was cleaned thoroughly and extra fans were taken

away from other fellow workers and turned on in this area so this testing could be done—this air quality testing.

Our lives have completely changed because of this chemical poisoning that we suffer from. I can no longer play with my own granddaughter for more than a few minutes. When I want to bring her home with me for a weekend I can do none of this anymore. I haven't got any energy. Nothing. My whole life has changed. We're here today to see if we can't get some help from somebody.

Senator REID. Thank you very much.

Members of the committee, we're going to be bound to the same time standard as the witnesses because we have, as I indicated, a lot of witnesses to hear today. So I will start with my questions for seven minutes.

Ms. Sutherland, on page four of your statement you indicate that you started out, as an office clerk, and you would go to the back of the warehouse and mix things before selling them; is that right?

Ms. FORBES-SUTHERLAND. That's correct, sir.

Senator REID. And sometimes you mixed a lot and sometimes not so much. The more you mixed, the sicker you got; is that true?

Ms. FORBES-SUTHERLAND. That would be true, sir. Especially during the summer. We suffered the same problems in our warehouse that Boeing and Lockheed have, in that we had no ventilation, no air conditioning, nothing, and the temperatures would get up over one hundred and twenty degrees.

Senator REID. I draw the committee's attention to page six of your statement describing the symptoms that you complained of. You even considered suicide; is that right?

Ms. FORBES-SUTHERLAND. Correct.

Senator REID. You became depressed. You became angry when there was no reason to be mad at anyone; is that true?

Ms. FORBES-SUTHERLAND. That's correct, sir.

Senator REID. You used to do the New York Times crossword puzzle, and now you can't do the—

Ms. FORBES-SUTHERLAND. I can't even do the TV Guide crossword puzzle anymore.

Senator REID. You had heart palpitations, anxiety attacks. You became afraid for no apparent reason.

Ms. FORBES-SUTHERLAND. Yes.

Senator REID. We have here a panel of witnesses, one from private sector, Ms. Sutherland, others from Lockheed, Boeing. We have a wide-ranging group of people here.

Ms. Schrum, I think you're the one that indicated that when you went to the grocery store you got sick. Why would you get sick at the grocery store?

Ms. SCHRUM. I guess from fumes in the soap department, or something.

Senator REID. Now all the witnesses, at least the way I understand it, at times suffered weight loss. Is that true? Does anyone disagree with that?

[No response.]

Senator REID. So that was one of the symptoms.

Starting with you, Ms. Liberty, did you know what chemicals you were working with?

Ms. LIBERTY. I was aware of several of them, except when I spent—except when it came down to, it seemed like to them they were running out of cans so they had plain cans with nothing on them. Then I got suspicious about it. And as well as me not aware of when I was being used as a guinea pig. I had no—I was not aware of anything.

Senator REID. Now, Ms. Liberty, what was your health prior to going to work? You're with Lockheed. What was your health prior to going to work at Lockheed?

Ms. LIBERTY. I've had female problems in the past.

Senator REID. Gynecological problems, but that's the extent of it? Female problems. That's the extent of your sicknesses prior to going to work at Lockheed.

Ms. LIBERTY. That's correct.

Senator REID. How long did you work at Lockheed?

Ms. LIBERTY. It will be 10 years in June.

Senator REID. You are 33 years old now. You have indicated that you go to doctors almost every day. Who pays for these doctors?

Ms. LIBERTY. The lawyer is taking care of part of these doctors. Kaiser—I have insurance that takes care of the other part. They now want me to start another type of treatment, and I can't do it because I don't have any money.

Senator REID. Ms. Liberty, some of the information you gave us said that these chemicals caused upper extremity dermatitis. Now, to most lay people dermatitis means a skin rash. Explain in more detail, if you could, what your skin rash is like?

Ms. LIBERTY. I have very large white spots on my face. Also, my face peels quite a bit. These are not normal spots on my face.

My hands—

Senator REID. You have explained that you lose your thumbnails and they bleed and that's why you wear the gloves; is that right?

Ms. LIBERTY. Right. And my hands are so sore I can't do any of the activities I used to do.

Senator REID. You worked for Lockheed and you were involved in national security jobs; is that right?

Ms. LIBERTY. No. I wasn't.

Senator REID. So, at no time were you doing anything relative to national security. Were you able to report your sicknesses to your employers without any constraints?

Ms. LIBERTY. Not really. You would go on—they would talk about the same chemicals over and over and over because I would question about the ones that were in the cans not marked, and they would say they are all the same.

Senator REID. Ms. Gausman, we limited your time, and you had a statement that you weren't able to finish.

Ms. GAUSMAN. Yes.

Senator REID. If you could tell the committee, what was wrong with you?

Ms. GAUSMAN. I initially had very bad breathing problems and I couldn't catch my breath.

Senator REID. And that was immediately after you were exposed to the United Parcel truck?

Ms. GAUSMAN. Absolutely. Within an hour. I had my esophageal lining burned from this acid. I was just exposed one time. That's it.

And I have many of the similar problems that Lori has—neurological, memory loss. I have a degree in speech pathology, audiology. I also have a California license for real estate. It takes me a lot of time to put together a deposit slip for the local bank. It is very difficult for me to read.

I have many similar problems.

Senator REID. At Lockheed and Boeing, in the type of work you did, were there any men doing the same thing?

Ms. LIBERTY. Yes, there were. There were a lot of them. Five people that worked at Lockheed had passed away from the same chemical use that I did.

Senator REID. Did any of the men get sick?

Ms. LIBERTY. There are several men that got sick. I'm not on the suit. There is a major lawsuit that has been filed.

Senator REID. What about at Boeing? Were there men that were sick?

Ms. SCHRUM. Yes, there are men.

Senator REID. Are most of the people that work there women?

Ms. SCHRUM. Yes.

Senator REID. Senator Warner?

Ms. GAUSMAN. I have a question. We have other members that aren't here present today who you will be hearing from in the field hearings. One is Clyde Glasser, who was a supervisor who worked indirectly and was exposed to some of the Stealth chemicals. He did not work behind the black curtain. It cuts across all lines—age lines, sex lines, etc. That's our indication. All these people are ill. Age and sex don't seem to have any bearing.

Senator REID. Senator Warner?

Senator WARNER. Thank you, Mr. Chairman.

I think that is a very important question, and I will return to it momentarily.

First, I'd like to express to you our respect and sympathy for what you have endured and the hardships that I am certain each of you experienced in trying to come here.

While we live in these hearing rooms and listen and talk to people just about every day, we know it is a new experience for you, and I think each of you held up very, very well, given the extraordinary circumstances under which you have come here today.

I'd like to return to the chairman's question, because I have had the opportunity to visit many of these same plants in which you worked—perhaps not the very rooms. But you get the feeling as you walk through the assembly lines and other areas of literally hundreds and hundreds of people involved.

Ms. Schrum, for instance, in your area how many workers were there?

Ms. SCHRUM. Between 25 and 30 per shift, all three shifts.

Senator WARNER. Was your area a confined area or just a part of a very large room?

Ms. SCHRUM. It was part of a very large room.

Senator WARNER. And in that room how many people would be working?

Ms. SCHRUM. Probably 80 to 90 people.

Senator WARNER. And then there were perhaps several shifts a day?

Ms. SCHRUM. Three shifts a day.

Senator WARNER. So you're talking about several hundred people a day working in these areas?

Ms. SCHRUM. Yes.

Senator WARNER. And I'm sure you got to know each other to the extent you could and shared these common problems. I think Ms. Liberty said that men were affected just as well as women. It is not a situation endemic just to the female; is that correct?

Ms. SCHRUM. Yes. There were always more women in these areas than men.

Senator WARNER. Percentage-wise among the work force?

Ms. SCHRUM. Yes.

Senator WARNER. What about the supervisors and management and engineers? Did they come down and see this sort of situation? Were you able to communicate?

I guess what I'm trying to determine is the extent to which you were able to communicate your problems up the chain, and perhaps the chain of management reacting and coming back down with any thoughts to help.

Ms. SCHRUM. There were none. You either worked with this material or you did not have a job.

Senator WARNER. And the peer pressure was quite extensive among your co-workers; namely, that if you didn't do your job or got on the medical list and they lost the occasional honorarium that you got, you caught a lot of criticism? Is that right?

Ms. SCHRUM. Yes, and worse.

Senator WARNER. But weren't they, likewise, suffering?

Ms. SCHRUM. Some of them were. But our area was always considered a training area, so we had a lot of people going in and out. The ones that weren't sick, boy, they didn't like it if you got sick.

Senator WARNER. But there were some that apparently were able to endure these conditions without any manifest deterioration in their health or work habits?

Ms. SCHRUM. Yes, there were some. But most of those people were the people that were temporaries. They would only be in there for three months, or maybe six months at the most.

Senator WARNER. Ms. McCormick, do you have any observations along the line of how it affected everyone?

Ms. McCORMICK. When I left the shop there were still a lot of sick workers waiting to see what we were going to do—the ones that were already out there sick and told we couldn't ever work again. They were still very fearful for their jobs.

We have had people call us crying over the phone.

Senator WARNER. What about the attitude of the management and your supervisors? They obviously had to experience certain periods—maybe shorter periods—of these conditions.

Ms. McCORMICK. I have only had two supervisors come up, just before I left the building when I was probably at my sickest point, tell me, "My god, something has got to happen around here. We have got to figure out a way to get rid of this material." He said, "We cannot do it." In other words, it has to be the workers that do something.

The only thing I can say about first-line supervision—I hate to put it this way. They are like little robots. They do as they are told, and they will do nothing more.

Senator WARNER. Were they not also subjected to the same conditions that were affecting you?

Ms. McCORMICK. Yes. I can tell you for a fact that one of the things that happens when you are exposed to this is mood changes. It is very real.

I have never in my life had a problem with a supervisor or a co-worker. I got so bad one day that I was literally screaming at this man and I had my finger in his face marching him down the aisle backwards.

Supervisors were arguing among themselves. They knew something was wrong; they just didn't know what to do about it and wouldn't take a step against any higher management.

Senator WARNER. How long did these problems persist? Was it over several years?

Ms. McCORMICK. I was only in that shop from the summer of 1987 until the summer of 1988. So I was only there about ten months.

Senator WARNER. It seems to me that, given the conditions—and I don't question or dispute the problems that each of you endured—that the work product, the ability to produce these products, it would seem to me would be falling off due to the fact that the workers simply couldn't perform the work. Somebody up the line has got to begin to realize they're not getting the products.

Ms. McCORMICK. I also, just before I left there, they were insisting that this—first of all, I was a clerk. I was never invited to any meetings that they started holding on this problem with this material. Finally one day I did walk into one of those meetings uninvited. We were left alone in the shop—the clerks were.

But I did go into a meeting and I listened to the general of that shop say, "This material is here to stay. It cannot harm you in any way." They had medical experts from Boeing there telling them the same thing.

Afterwards, I noticed they started rotating people—bringing people from other shops. People were going out getting so sick missing days of work they'd rotate people.

Senator WARNER. But were you able to keep up with the production schedule? In other words, it seems to me if so many people are ill that you simply couldn't get the product off the assembly line and out of the shop. At some point management is going to say—

Ms. McCORMICK. They were keeping up by constant overtime. Constant, seven-days-a-week overtime.

Senator WARNER. Mr. Chairman, I'll return to this question.

Senator REID. Senator Lieberman?

Senator LIEBERMAN. Thank you, Mr. Chairman.

Let me echo Senator Warner's comments. I'd like to thank the witnesses for coming forward and talking.

Obviously this is difficult for you to do, but without the kind of testimony you have offered, as the people who have been most directly affected, we are not able to determine the truthfulness of what is happening and what to do about it.

Ms. Schrum, you said earlier during your testimony that you are not today the same person you were five years ago. Just for the record, I want to ask each of you—all the witnesses before me—whether you experienced in any way the symptoms you have described here prior to the work that you did or the exposure you had to these chemicals. Did any of you have any symptoms like the ones you have described before your exposure to these chemicals?

Ms. SCHRUM. No.

Senator LIEBERMAN. I take the silence to be a no; is that correct?

Ms. GAUSMAN. I was exposed just by merely being a bystander. I was exposed to highly toxic acid carried on a United Parcel van. No. I did not have any symptoms that we were talking about.

Lori, did you?

Ms. LIBERTY. No, I didn't have any symptoms.

Senator LIEBERMAN. So I take it no one on the panel did.

Ms. GAUSMAN, you got to the point I wanted to ask you. I don't fully understand the incident in which you were exposed and what your relationship was to the van. Were you working?

Ms. GAUSMAN. No. Absolutely no. I want to make it clear.

Senator LIEBERMAN. Just describe the circumstances.

Ms. GAUSMAN. I was standing near a parcel van which was carrying an acid.

Senator LIEBERMAN. Where was this?

Ms. GAUSMAN. In the City of Van Nuys in California.

Senator LIEBERMAN. What time of the day was it?

Ms. GAUSMAN. Early morning.

Senator LIEBERMAN. You just happened to be on the street then?

Ms. GAUSMAN. Yes. I was on my way to the Planning Department?

Senator LIEBERMAN. Where?

Ms. GAUSMAN. The Planning Department, for real estate purposes.

Senator LIEBERMAN. Yes.

Ms. GAUSMAN. And I happened to be standing near it. The driver became overwhelmed by fumes in the back of his van. He pulled up to the hazardous materials department of the fire department. He went in and tried to get them to come out and take care of it.

I happened by at that time, and I was exposed. Just after I was exposed, 250 people were evacuated.

Senator LIEBERMAN. From that immediate area?

Ms. GAUSMAN. Absolutely. And, as I said, I got one exposure.

Now, many of the symptoms are similar because they depict immune system breakdown, from whatever the chemical.

Senator LIEBERMAN. So I take it that your understanding is that this was a normal parcel van?

Ms. GAUSMAN. Absolutely.

Senator LIEBERMAN. And it was carrying this toxic material from supplier to user?

Ms. GAUSMAN. Yes, and that is a normal course of events. That is why we worked very hard to get safer toxics transportation in California.

Senator LIEBERMAN. Right.

Ms. GAUSMAN. And the L.A. County Board of Supervisors has voted on a motion to limit toxic transportation on parcel vans.

Most people are not aware that parcel vans carry the same acids that cause toxic clouds.

Senator LIEBERMAN. Right along with all the other packages that might be in the van?

Ms. GAUSMAN. Absolutely, Senator Lieberman. Also, they carry food with these toxins, and cases of pesticides throughout our country.

Senator LIEBERMAN. And I take it there is no necessity at the local level for permits to carry those toxic materials on a parcel van. For instance, in Connecticut I know we have a fairly extensive law requiring hazardous waste shipments to be permitted, and in the course of those to be travelled all along when the full shipment is related to that. I never appreciated the fact that those materials might be transported by—

Ms. GAUSMAN. Mr. Lieberman, I started the coalition because of my own injury. Every indication that I have from the general public and from other people is that they were not aware that this type of transportation occurs. You don't think of it in that manner because it is so mundane. Certainly I was not warned.

Chemical injury happens in all areas. Ms. Sutherland was a clerk. Here we have a chemical sales person who was dealing with chemicals. She worked with MEK. She worked with a lot of the chemicals that were being transported to Lockheed and Boeing all across the country.

This is a very serious problem. People are getting sick all over the country.

Senator LIEBERMAN. So, if I understand correctly, what you have tried to do with your group is, in California, for instance, get the legislature to require some sort of permit procedure for the transporting of hazardous material?

Ms. GAUSMAN. Even more strict regulations. We don't feel that the general public, first of all, knows their rights. They are not warned. We feel, secondly, that if they were aware they certainly would not want these types of toxics to go on common carriers. We would like to see that stopped. That's why we recommended that this committee recommend to the Department of Transportation and our country to help that process along. It started with the L.A. County Board of Supervisors who voted to stop toxic transportation on parcel vans.

But I want to make it very clear that these kind of chemical exposures—I'm very proud of the Senate Committee and Senator Reid because he has taken the stance that these chemical exposures can occur whether indirectly or directly exposed with various chemicals, composites, or solvents, as Lori worked with.

Senator LIEBERMAN. Let me interrupt, because I want to ask Ms. Forbes-Sutherland two questions.

I'm interested particularly because you are outside of the aerospace industry, and most of the rest of the testimony that we are going to hear today relates directly to that industry. Were you ever warned by your employer that you were dealing with materials that could be hazardous to your health?

Ms. FORBES-SUTHERLAND. No.

Senator LIEBERMAN. Were there any precautions taken for you? Were you instructed, for instance, to use special gloves or to protect your breathing system during the use of these materials?

Ms. FORBES-SUTHERLAND. At no time.

Senator LIEBERMAN. Do you think that the injury you suffered was from skin contact or inhalation or both?

Ms. FORBES-SUTHERLAND. I think it was a combination of both.

Senator LIEBERMAN. Let me ask you this: since I gather that the company you worked for supplied not only the aerospace industry, but other industries, as well—and I understand you are not an expert, although you have suffered, and in that sense you are an expert—do you think that the dangerous consequences that you obviously believe result from these materials exists outside of the aerospace industry, as well?

Ms. FORBES-SUTHERLAND. Absolutely, because at least in aerospace we have some measure of regulation. We don't have that, oftentimes, in the small job shop. Just around Washington, D.C., itself, you have small industries that are using these materials all the time. They'll have bottles of chlorine, bottles of MEK, bottles of god knows what in their shop.

People either don't care or they are uneducated, or for whatever reason, and they have no idea what it is that they are using.

Senator LIEBERMAN. Thank you.

Ms. FORBES-SUTHERLAND. You're welcome.

Senator REID. Ms. Schrum and Ms. McCormick, what kind of work schedules did you have during the time that you worked with these resins or other materials?

Ms. MCCORMICK. For myself, I was working a lot of overtime.

Senator REID. What do you mean by a lot?

Ms. MCCORMICK. Seven days a week.

Senator REID. Ms. Schrum?

Ms. SCHRUM. If I wasn't sick, it was seven days a week.

Senator REID. How long did you work at the company?

Ms. SCHRUM. From 1984 to 1988. But I was off a lot being constantly sick. I had in roughly ten years total.

Senator REID. Ms. Gausman, I note that you have some type of bandages on your legs, and I'd like the record to reflect that. Does that have anything to do with your condition?

Ms. GAUSMAN. Yes, it does.

Senator REID. Explain what that condition is.

Ms. SCHRUM. I have problems with my ligaments, and especially in my knees. I have to wrap my legs. I have to go to the chiropractor three times a week for treatments for my knees. Also, now my elbows have become to where the ligaments don't mesh properly with the bone, and it becomes hyper-flexed. I have swelling problems with my joints. I get that quite often. It is extremely painful. I did not have any trouble like that before.

In the morning as I get out of bed, the first sensation I feel is pain, as Lori Liberty does, and as many of these people do. And it goes on.

We don't know what will happen to us. We don't know that we won't get cancer. We have seen other people get cancer.

I want to help other people, also.

Senator REID. So we have a complete record here, I would ask you—Lori has already told us how old she is. Tell us how old you are.

Ms. GAUSMAN. I'm 40. This happened when I was 36.

Senator REID. And Ms. Sutherland? I'm sorry to have to go through this, but we want the record to be complete.

Ms. FORBES-SUTHERLAND. I'm 39.

Ms. MCCORMICK. I'm 47.

Senator REID. Ms. Schrum, how old are you?

Ms. SCHRUM. I am 44.

Senator REID. Thank you.

Also, I want the record to reflect that Lori Liberty is wearing dark glasses and gloves.

Senator Lieberman.

Senator LIEBERMAN. Very briefly, Mr. Chairman.

I would like to clarify one point. Ms. Liberty, were you ever warned by Lockheed that the materials you were working with might be hazardous to your health?

Ms. LIBERTY. They, in a sense, warned you, but they did not, on the other hand, provide you with the proper equipment. They couldn't enforce, which they did not make it mandatory.

Senator LIEBERMAN. In other words, they told you that the stuff you were working with might be dangerous, but—

Ms. LIBERTY. Dangerous, but they didn't push the issue. There was no issue pushed.

Senator LIEBERMAN. What did they do to protect you from the danger? Did you have special gloves?

Ms. LIBERTY. No. They didn't provide you. I had to wear gloves, myself.

Senator LIEBERMAN. Which you brought yourself?

Ms. LIBERTY. I went to Medical and they supplied them to me and I had to change them every ten minutes. And then management got upset with me because I had to stop and change my gloves. They should have been glad enough that I bothered to go to work with my hands in the pain they were in.

Senator LIEBERMAN. Do you think that the damage that you suffered was entirely from skin contact? Or was some of it from inhalation?

Ms. LIBERTY. I believe it is partly both.

Senator LIEBERMAN. Both.

Ms. McCormick, let me ask you the same brief series of questions. Were you ever warned by Boeing of the danger of the materials you were working with?

Ms. MCCORMICK. I had no idea what chemicals were in that shop. Like I said earlier, being a clerk, when the problems did happen and they were holding meetings on it I walked in there, and we were told that material could not harm us in any way.

Senator LIEBERMAN. So you were told quite the opposite?

Ms. MCCORMICK. That's right.

Senator LIEBERMAN. You were told that even after that bizarre scene you described with workers vomiting all over the place?

Ms. MCCORMICK. Everything. Yes.

Senator LIEBERMAN. Yes.

Ms. McCORMICK. They still told us that in no way could this material hurt us.

Senator LIEBERMAN. So that, presumably, you were provided with no protective material?

Ms. McCORMICK. Nothing.

Senator LIEBERMAN. No gloves?

Ms. McCORMICK. We had one girl there on her own, just from the building being a dirty building, on her own went out of her way to wear complete gear from head to toe, and she was told by supervision—I think, if I am not mistaken, by the general, himself—if everyone in that shop used that kind of gear that she did, Boeing would go broke. They had that lady in tears that day.

Senator LIEBERMAN. Thank you.

Ms. Schrum, let me ask you the same questions. Were you ever warned by Boeing that you were working with dangerous materials?

Ms. SCHRUM. No. Never. In the beginning there was no warning, no data sheets, nothing on it. They said it would not hurt you.

Senator LIEBERMAN. Right.

Ms. SCHRUM. The worst you are going to get is a mild headache.

Senator LIEBERMAN. Right.

Ms. SCHRUM. Later on—probably shortly before I went out on a LOA—they said you have to wear gloves and you have to wear masks, but most of the people didn't have them. The one time that we had a crew meeting we had a doctor or somebody there that said we had to wear these big, thick, black gloves and you could only wear them for 12 minutes at a time. They were very expensive. They were \$26 a pair. We only had them for a day or two. You could not get them any more.

Senator LIEBERMAN. What happened?

Ms. SCHRUM. They said they were too expensive.

Senator LIEBERMAN. They provided those gloves after one of the incidents you described where a lot of people got sick?

Ms. SCHRUM. No. They gave them to us after a crew meeting. Still, all that time, we were never provided with any information from supervision about what it would do to us. Everybody was having a fit and screaming they wanted some paperwork on it, but they claimed there was nothing available.

Senator LIEBERMAN. Okay. Thank you.

Senator REID. Ms. Liberty raised her hand and wanted to say something.

Ms. LIBERTY. I wanted to say that as far as equipment, they would never push any issue. They never had—everything they ever as far as covering arms, smocks were all offered to several departments other than ours. They never had correct gloves. They never had—at times they ran out of the gloves, as well, but I want to say that as far as—I've lost my train of thought here.

Ms. GAUSMAN. She has a real problem with her memory. She has told me that she complained for almost two and a half years and that she was ostracized by her supervisors at various positions that she has held.

Also, she was used with monitoring equipment after she complained so often. It seems to be that there are only a few people that complained, and they seemed to be singled out, as Faye was

testifying to. Lori was one of those. She literally had monitoring equipment strapped to her, and her union rep will testify on her behalf, she has told me.

Is there anything else you want to say? Do you want to talk about what the monitoring equipment actually was?

There was a chemical they tested with her. They never told her what it was. They strapped her with monitoring equipment.

How did they do that, Lori?

Ms. LIBERTY. I had tubes that came out over the front of me with no safety equipment on, and it came out in parts—they had tubes that came out on different parts of the body, and it measured levels of intake of the chemical that you use.

Senator REID. What parts of your body? I don't understand.

Ms. LIBERTY. They have a tube that came out and measured as far as me bending over to work on the project, how much intake of the chemical I drew into me. And they wanted to see about the inhaling, they wanted to know the skin contact.

Senator REID. We understand.

Ms. LIBERTY. There is one thing they didn't do, and that was offer us any of these MSDSs, and it was told the Pentagon was going to finally go down there six weeks before and they cleaned up their act, and then the MSDS data sheets finally were sent out to everybody. We had no idea what was in these chemicals.

Senator REID. Thank you very much.

We really appreciate all of you being here.

Mr. Gordon, we appreciate your being here. What we do appreciate is your not interfering with the witnesses. We appreciate that very much.

Mr. GORDON. Senator, I have offered the hospitality of my office on the West Coast should you seek to investigate further.

Senator REID. I hope we have a federal office building out there some place.

Mr. GORDON. Mine is more comfortable, and the coffee is pretty good.

Senator REID. Thank you very much.

The next panel of witnesses consists of Doctor Gordon Baker, Seattle, Washington; Mr. Peter Breysee, Seattle, Washington; and Mr. George Robinson, Washington, D.C.

Doctor Gordon Baker is a physician. Mr. Peter Breysee is an associate professor at the School of Public and Community Health, University of Washington. Mr. George Robinson is with the Occupational Safety, Health and Community Services Department of the International Association of Machinists and Aerospace Workers.

Doctor Baker, you will be the first witness on this panel. We would appreciate it if you would proceed with your testimony.

[Witnesses sworn.]

Senator REID. Doctor Baker, please proceed.

STATEMENT OF GORDON BAKER, SEATTLE, WA

Dr. BAKER. I'm Doctor Gordon Baker.

In the way of background for my getting into this, I went to medical school at George Washington University School of Medicine

here in the District of Columbia. After I finished my medical school and internship here I was a U.S. Navy flight surgeon. I was stationed at an air facility in Arizona where we had an aircraft overhaul and repair facility which got me very interested in these problems which we are now seeing.

I specialize in allergy. I trained in allergy at Harvard. I am a member of the American Academy of Allergy, the American College of Allergy, and the American Association of Certified Allergists. For about 14 years I lectured at the University of Washington in the Department of Air Quality Control, directly concerned with subjects referable to the work place.

Now, what is allergy and what does it have to do with this? Allergy describes a response of the human body to a substance that may not affect everybody.

We all recognize that certain allergens, such as pollens or animal hair, dust, mold, and drugs, may cause allergic reactions; however, it has not been recognized that chemicals can also do this.

I find the idea rather illogical that a drug can cause a toxic reaction but a poison might not be suspected of doing this when, in fact, it does.

Of the outstanding chemical problems we have had lately, take the spill at Bophal, India, with isocyanates which did so much damage. I have seen a lot of people exposed to isocyanates. In fact, a lot of us are sitting on cushions made of urethane foam made with toluene isocyanate. This was developed by the Nazis as a war gas in World War II. It rips proteins apart, recombining them to form new proteins that the immune system attacks as foreign. I think if we burned a couple of pounds of foam cushions in this room we could do us all in.

As far as what chemicals can do, we've had people on the drug scene with their glue sniffing producing severe brain problems.

These people with severe brain problems may have an immunological response to the chemicals, or they may have toxic responses.

When I was in the Navy I remember my commanding officer called me in and he was very upset because an air control operator had abandoned the tower, his position of duty, with seven aircraft stacked up calling for landing instructions. I was supposed to examine him. As I look back, I completely missed what was happening. Now I know he had typical organic brain syndrome symptoms.

He was working in his off hours loading pesticides into spray planes, which caused a tremendous change in his personality and his behavior and his ability to cope.

However, in my years of experience with different chemicals, I have never seen anything approaching what I am now seeing with Boeing. As of now, I have seen over 130 patients from Boeing. It has completely disrupted my practice. I have to take these people on my lunch hour or after hours just to get them in. Let me tell you what we're seeing.

I think these workers that were here tried to accurately communicate how sick they are, but they're much sicker than they know. Out of the first 100 of these people 52 of them—that would be 52 percent out of the first 100—had skin rashes. Now, this is not hysteria and this is not emotional and it is not malingering. You could

see the skin rashes. There were sores on their skin of varying degrees of severity.

Sixty-eight percent have irritated eyes—red eyes. Eighty-five out of 100 have irritation of their upper respiratory tract. They will have nasal or sinus congestion or pain. Some have nose bleeds. Some have sore throats. They may have chest problems such as pain in their chests or shortness of breath or chest congestion or coughing. If they happen to have asthma or emphysema, they may have aggravation of these problems.

Some of these first hundred, approximately 24 percent, have gastro-intestinal problems with nausea or diarrhea or vomiting. About 5 out of the 100, 5 percent, have blood in the urine.

A lot of women have abnormal periods with excess bleeding. Some of them apparently had abnormal pregnancies, but I haven't gotten into that.

About 11 percent of the workers have musculo-skeletal problems with muscle pains or aches or joint pains.

And I might mention, these problems typically were not present prior to exposure. A typical history is a person who was well, who got exposed, then had these problems. Typically these problems tend to clear up when the worker is away from work and the problems get worse when the people are in contact with their work.

Of all the symptoms, though, by far the most severe, are those related to the central nervous system. I might mention that this is totally unprecedented in my experience and practice. In a normal group of allergic patients we just don't see central nervous system problems.

These people have severe headaches to the point of incapacitation. They have extreme fatigue. They have severe memory lapses. They have depression. They have decreased sex drive. They have changes in their emotions, changes in their personality, difficulty in coping. There have been an extraordinary number of families breaking up—parents losing their temper at children. It has been a most remarkable situation.

I have had a bunch of these people tested by neuropsychologists and psychiatrists, and they have found objective evidence of organic brain damage or organic brain poisoning in these people.

Organic brain poisoning or organic brain syndrome may be defined as "any change in the structure or function of the brain due to any cause whatsoever." With a little experience, I'm sure any of you in this room can diagnose organic brain syndrome. If you see an alcoholic staggering down the street tripping all over the place, that's an organic brain syndrome. Glue sniffing causes this. Mercury poisoning, such as Japan had when mercury got into their fish, can cause it. People or children growing up near a lead smelter who have chronic lead intoxication will have it.

This organic brain syndrome results in mental subnormality, difficulty in thinking, difficulty in dealing with life and dealing with tasks.

Now, as I mentioned, the first group of symptoms may clear up. But the patients with organic brain syndrome tend not to get better. I have followed a lot of them along, and they may feel a little better when they are away from work, but their mental capacity is down.

As for people are affected, of the first 100 patients 67 were female and 33 male, but that does not reflect a sex-linked difference, it is just a reflection of the overall makeup of the population in the work area.

I see blacks and whites and orientals. In fact, I was asked by the workers how many oriental patients I have among the affected workers and I only had three. The workers said, "Don't you realize that 40 percent of the women working in this area are oriental? They are scared to death, they are afraid. They have to support themselves. They are afraid they will get fired. They have to go to work every day or they won't eat."

As for the cause of these people's sickness, it has got to be the work place exposure. It is just cause and effect. People weren't bothered before, they are bothered while they are working, they do clear up somewhat while they are away. It is not a coincidence. All these people have similar stories.

It is not malingering. There is absolutely no motive for any of them to do this. There is no gain at all in this. In fact, they have everything to lose and nothing to gain. The insurance system is such that the patient gets nothing from this. There is absolutely no malingering, in my opinion.

This is not mass hysteria. There is no evidence of mass hysteria. In fact, the psychiatrist said that in depression and other hysterical cases you don't get skin sores and nasal problems.

In addition, we now have some immune tests that Doctor Alan Broughton will explain to you, but in encapsulated form, about 70 percent of these patients have positive tests to formaldehyde and 24 percent have positive tests to TMA, which is a plasticizer. These positive tests do not prove or disprove disease they simply show exposure. But in the control group, not one had a positive test of formaldehyde.

A group of these 100 sick workers—approximately half of them—have what we call auto-immunity or auto-antibodies. These are antibodies directed against the body's own tissue.

For instance, some have antibodies against their own stomach cells or stomach tissue, which results in a lot of these people having the nausea or vomiting. Others have antibodies against their kidneys. Still others have antibodies against their liver, or antinuclear antibodies, which may be associated with arthritis.

But most unusual in my experience is the presence of anti-myelin antibodies. Myelin is a sheath around the nerves like the insulation around a wire. Normal people just do not have anti-myelin antibodies, yet multiple sclerosis victims do have it. Out of the first 21 tests we have run, 8 out of 21 sick workers have anti-myelin antibodies. These tend to be the more severely ill.

The third group of tests measures certain white blood cells that are present in an activated poisoned immune system. We call them TA-1 cells or CD-24. In the control group of people, the only ones that showed elevations of these cells were ones that were sick with hepatitis or other diseases. But if you take away the ill people, no normal people had an elevation of these cells. Yet, out of the first 15 Boeing people we have tested, 13 had elevated TA-white blood cells.

There is also a substance called IL-1—interleukin 1—that is produced from damaged white blood cells called macrophages. As a matter of interest, using recombinant DNA techniques they tried to use IL-1 in treating cancer and other diseases but they couldn't do it because it would produce fever and muscle aches and pains and depression and fatigue. In other words, the presence of this substance in the bloodstream duplicates a lot of these symptoms. And the IL-1 is elevated in a large number of these patients.

So I feel that we have an epidemic on our hands. I'm getting patients not only from Boeing, but from other industries that use these materials. So I think we have a widespread serious problem that we are just beginning to recognize.

Senator REID. We'll have some questions for you, Doctor, in a short time.

Mr. Robinson.

STATEMENT OF GEORGE ROBINSON, OCCUPATIONAL SAFETY, HEALTH, AND COMMUNITY SERVICES DIRECTOR, INTERNATIONAL ASSOCIATION OF MACHINISTS AND AEROSPACE WORKERS

Mr. ROBINSON. Thank you, Mr. Chairman.

First of all, let me tell you how much I do appreciate the opportunity to be here before your committee. I think it offers working people and the unions an opportunity to air the problems that we have in the work place, especially in new technology.

I want to digress from my written testimony, if that is okay with you, and shorten it up.

Senator REID. Your prepared testimony will appear in the record.

Mr. ROBINSON. Thank you, sir.

In brief, my time with the union—presently today I am the Director of Safety, Health, and Community Services, and I have held that position for the last 11 years. Prior to that, I worked as a business representative, and then a directing business representative, which would be the president of a district lodge, for 18 years. Prior to that I worked as a shop steward and a chief steward and held various offices in local lodges and district lodges.

In June of this year I will complete my 35th year with our union.

I also am presently on leave of absence from United Airlines. I am an airline mechanic, and they seem to be causing a big stir these days.

What I'd like to talk about, basically, is the Boeing plant and what I have found there, and also the Lockheed plant.

Initially from Boeing I received a letter in about June of 1988 from one of our representatives by the name of Bob Ripley, and Bob asked me a question or questions basically dealing with some of the health problems that you have already heard about from some of the witnesses from Boeing.

I spoke with our industrial hygienist that we keep on staff, and after we met and discussed the different problems—and I should tell you that I also had served for a year on the methylene dianalyln rule-making committee of OSHA, and so I did have some knowledge. I gained quite a bit of knowledge on at least carbon

fibers in that one year that I served on that rule-making committee.

But I did have discussions with our hygienist, and, as a result of those discussions, I did return a written response to Bob Ripley and told him the problems that I could see, especially with the phenol and formaldehyde exposure that might be occurring in the plant where they might be using that in fiberglass—also cavlar.

There was another item in there, also. They were using what we call a fire retardant in the product they were making, and that also lent itself to possibly causing some disease.

I offered, also, to come out and visit the plant because I really didn't have any other knowledge of what was going on in the Boeing plant. Bob asked me to come out, and I went out in August of that same year.

What I have listened to this morning I could back up 100 percent in the areas of what I saw.

My entrance to the plant, first of all, took me into one particular area, basically, where they were doing fiber work on all the fiber products. For the most part, the employees there were of the female gender which, in a sense, sometimes might surprise you because I work with so many men throughout the different work places that we represent around the country. But here, in this particular shop, the majority of the people working in there were of the female gender.

As we went around and spoke to them, the first thing I noticed was that nobody was wearing any protective apparel—especially gloves. Some were wearing smocks. One person was wearing a respirator, and that was a man, and he was allowed to do that as far as Boeing was concerned. He was the only person. I may have seen one or two people wearing gloves. But it struck me because of all the discussions we had had for a year in our methylene dianalyn committee the one thing we talked about was dermal contact with these particular fiber products—especially in wet lay-up processes. So I was really struck heavily.

The next thing I found, of course, was the ventilation system in the Boeing plant. When I went in there I could sense it, myself, that there wasn't really enough ventilation, in my opinion—without any measurements, even. And, of course, I have been in other plants that when you walk in the door and you know people have been complaining it might trip your mind to say well, here is the problem. But to me it just seemed obvious, from what I could even smell in the plant. It gave me a sense of odor in that there was a high exposure.

I was aware, also, that NIOSH had made measurements of the plant, along with the company. Their measurements indicated that they were below the present OSHA levels.

But, regardless of that, I found, myself, that there was poor ventilation. This was even after Boeing had made improvements in the ventilation in that plant. So prior to my visit and prior to their improvements the exposure had to be much more serious.

The next thing I found was that in the material safety data sheets that should be made available by law and by regulation under OSHA—some were posted on the board, normally in what I would call a remote place, not directly near the workers. I did not

find, at any time, a material safety data sheet that I could correlate against the chemical that people were working with. Perhaps the problem was that there were, in some cases, so many.

But for most cases there was no identity on any of the containers that people were working with, to begin with. And I'm not talking about a small container that you might fill up just enough to wipe on and wipe off and it would be exhausted; I'm talking about containers that would hold enough chemical or material that would last beyond one work station.

The only thing I can recall on those particular containers would be a number—perhaps a Boeing-19 or B-38. It appeared to me that it was just a Boeing nomenclature or counting process, but there was no identity. I never saw a canister with an identifying mark on it.

So it was difficult, if not impossible, then to go over and take a material safety data sheet and correlate it against the chemical.

The last thing I found in that visit—and this was an eight-hour visit that day—was that I didn't meet the first person that said they were trained, and I asked everyone I talked with if they had been trained. Not one person could tell me that they had been trained on the chemical substance they were working with.

Now, as I went around I was talking to people who aired complaints such as those heard today, and certainly there were far more complaints than what we have heard today here in testimony. I asked the people about the different problems they were encountering.

One of the things that kept coming up among the employees was that many of them were afraid to even report illnesses. They were afraid because they might be demoted or even, in some cases, dismissed. They had reason to fear that because there had already been dismissals. Because the company couldn't find work for some people to do, they would dismiss them. And for those they could find other jobs for, they would demote them and put them in other positions. So those persons that I spoke with were, for the most part, afraid to even mention the possibility that they may be ill.

I don't think we ever really had a true look at the number of people, other than listening to what Doctor Baker testified here a few moments ago. There were quite a few people suffering from disease in that particular department.

After that, on that very day NIOSH had been in the plant doing an investigation, and I believe they were doing a follow-up investigation, and there was a meeting called by the company. Boeing had set up a meeting in an area like a cafeteria, and they brought in the entire shift of those persons who were exposed. NIOSH had a toxicologist there, along with a doctor, and they addressed the meeting along with, I believe, a vice president of Boeing.

I should tell you that my representative told me that the day before he had spoken to a NIOSH representative, and the NIOSH person said to him, in a very foul tone using curse words that there was nothing in this plant that could cause the illnesses that these employees were complaining about, that it was nothing but hysteria, and that the newspapers should be sued. There were newspapers publishing the problems in the plant in Seattle.

The day we were in this meeting, the NIOSH reported to the workers and said pretty much that very thing—without the curse words—that there was nothing in the plant that could cause these illnesses, and, in fact, that it had to be hysteria. One of the persons stood up and asked the NIOSH representative if it was true how he said it the day before—and although he didn't repeat exactly what he said the day before, he was severely embarrassed before the people.

We asked him, notwithstanding all the air measurements that they were doing or air sampling that they were doing out there, if they would not listen, at least, to the people and look at the problems that they were talking about, forgetting about air measurements thinking that is the cure-all. But they brushed those remarks aside. And, of course, I would tell you further they belittled, Doctor Baker. They made an attempt to belittle Doctor Baker's findings.

We left that meeting. I know the people were quite disappointed. I was extremely disappointed. We have had no further conversations with NIOSH about that.

I did ask our people, before I left there, to please file another complaint with the State plan out in Seattle. I should tell you that the State had been in there previously and investigated Boeing and had given them a clean bill of health on every occasion, to my knowledge, and they had failed to ever cite them on failure to post MSDSs, failed to cite them on their lack of training, failed to cite them for the refusal to label their canisters or cans or containers that they had these chemical substances in. In short, the State plan really failed the Boeing working people totally and completely.

I asked our people to refile the claim out there again, and our feeling was that if they came back in and did the same thing that I would come to the Federal Government and ask for their interventions as far as taking care of the OSHA regulations at Boeing.

I believe that the State plan did come back in. I haven't seen the citations. I understand they did come back in and they have issued some citations to Boeing.

Senator REID. Thank you very much for your testimony, Mr. Robinson.

Mr. Breysee.

STATEMENT OF PETER BREYSEE, ASSOCIATE PROFESSOR EMERITUS, SCHOOL OF PUBLIC AND COMMUNITY HEALTH, UNIVERSITY OF WASHINGTON

Mr. BREYSEE. I am, at present, associate professor emeritus at the Department of Environmental Health in the School of Public Health and Community Medicine at the University of Washington. I am a certified industrial hygienist.

The Department of Environmental Health in the School of Public Health is financed partially through the State Industrial Accident Insurance Fund to act as consultants to the Washington Industrial Safety and Health Administration program. We act on the State level the same way that NIOSH acts on the federal level. In my over 30 years of experience at the University of Washington,

over half of that time has been spent in field investigations. In fact, the Department of Environmental Health started doing field investigations in 1951, and in 1963 by legislative enactment.

In addition, I have been director of the graduate program in industrial hygiene and safety for ten years. So I have both academic experience and field experience in this area.

As a certified industrial hygienist, I was asked to explain a little bit about what the industrial hygienist's role is in problems of this kind.

First of all, usually the first individual that is contacted when a problem like this occurs is an industrial hygienist—either a state industrial hygienist or a consultant industrial hygienist, or, in some cases, the company's industrial hygienist.

Usually the industrial hygienist is also the first one on the site. Unfortunately, other professions in occupational health look at industrial hygienists as simply monitoring and making recommendations. That is only half of our responsibility.

The training in industrial hygiene includes anticipation, recognition, evaluation, and control of industrial hazards.

Anticipation: most industrial hygienists have some idea what to expect when they go out in the field—or should have some idea what to expect. For example, if labor/management relations are not good, you know you are going to be in trouble when you go out in the field. So anticipation plays an important role.

In addition, the industrial hygienist goes through a certification program. After a bachelor's degree in an appropriate engineering or scientific field, or a graduate degree in industrial hygiene and safety and one year of experience, they are subject to a written examination by the American Board of Industrial Hygienists, and, if they pass that examination, then they are an industrial hygienist in training.

After four more years of professional experience, the industrial hygienist then goes through a specialty exam administered by the American Board of Industrial Hygienists. Those specialties include the comprehensive practice of industrial hygienist, engineering practice, chemistry aspects, acoustical aspects, air pollution aspects, radiological aspects, and toxicological aspects. One can be certified in one or more of those aspects. I am certified in the comprehensive practice.

Oftentimes people in comprehensive practice act somewhat as a forensic scientist; that is, they gather all the information together—monitoring information, background information, what chemicals or physical agents the individual or the group of individuals are exposed to. Oftentimes it is important to hand out a questionnaire to find out how many people are having problems and when these problems occurred.

After completing this evaluation and possibly doing some monitoring at the site and reviewing the literature in the chemicals that workers were exposed to, a report is written to further environmental monitoring. The report will include the source or possible sources of the health problems and then recommend control measures to prevent re-occurrences.

My involvement in the Boeing problem began in about September of 1987 when I received a call from an employee saying, "Look,

they recently changed the product. They went from an epoxy resin—the FAA said the epoxy doesn't meet the flammable standards and you have to go to another resin that meets better flammable standards." And she explained that she was having health problems and wanted some assistance on what to do.

I suggested that she could, first of all, go to management. She said she had and they said there was no problem. I told her to go to the union. She said she had and they said they weren't aware of a problem. I asked if she had contacted a physician. She said no. I told her to contact a physician. It is important to contact a physician that has some background in these problems because 99 percent of the general practitioners have little or no training in environmental or occupational diseases—you place the general practitioner at a disadvantage, and also the employee at a disadvantage when they go to a general practitioner because of their lack of background in problems of this kind.

I then asked her if she had seen a material safety data sheet or had been provided training. The answer was no. These requirements are covered in the hazard communications standard that says all employees must be provided with material safety data sheets which describe the chemicals and the problems that are likely to be encountered, what the protective measures are. In addition, all employees must be provided with adequate training.

And I mentioned earlier she should ask for a materials safety data sheet. After I contacted the union, they sent me a material safety data sheet that said this product was a phenol formaldehyde resin and it listed the protective measures including respiratory protection and skin protection.

They also sent two samples of the pre-preg, which we analyzed in our laboratory. The analyze of which isolated as many as 60 to 70 different compounds, many at very low concentrations and most could be identified. Maybe 8 to 10 of the compounds cannot be identified. So that is another important problem.

Not only are employees being exposed to phenol and formaldehyde, but there are also the incidental chemicals that result from the reactions of these resins. The health effects of these complex mixtures are unknown.

The next contact was from a newspaper reporter—about six or seven months later—that asked what I knew about phenol formaldehyde. He had an employee calling concerned about her problems at the company. I explained to him what my role was and what information I had. And I said, "Look, it is difficult. First of all, we can't identify all of the chemicals that are produced. Secondly, we have a difficult time in monitoring for the presence of these chemicals. In many instances, our monitoring techniques are not able to identify all of the chemicals that are present in the atmosphere."

Later on, then, Doctor Baker contacted me and said he had about 50 patients, and still later he mentioned he had about 100 patients. We then collaborated and put the data together on individual symptoms were and on what tests have been performed on these workers.

Other factors involved here is that, first of all, the occupational health standard is not designed to protect all the workers. A

review of the preamble states that the standards are developed to protect most of the workers.

Secondly, the standard is really not designed to evaluate complex mixtures that might involve possibly 60 or 70 different compounds.

Thirdly, the standard is not directed towards a seven-day work week with one day off a month. That certainly extends the exposure period.

In addition, a number of these workers were subject to at least discomfort and possible heat stress in their place where the temperatures got up over 100 degrees. That added another factor to the job distress.

Furthermore, almost all of the occupational health data for exposure to workers is based on white males. There is little or no information based on exposure of chemicals to females, as far as the adverse affects are concerned.

Other problems we face in the composites is that the fibers and the dust of the composites are important. The fibers, if they are respirable, durable, and have the same length to diameter ratio as asbestos, are carcinogenic in animal experiments.

Many of the fibers and the dust particles may also contain various chemicals that have attached themselves to the dust and the fibers which may very well add additional hazards to the toxicity of inhaling those dust and fibers, complicating factors.

One of the chemicals, formaldehyde, has a number of studies indicating that workers and non-workers exposed to formaldehyde develop neurobehavioral aspects as a result of exposure.

In any event, my conclusions with the facts available were: first of all, the symptoms were reported after introduction of phenol formaldehyde. Complex mixture, many by-products, some not identified. Similar problems with other complex mixtures.

Formaldehyde potential for neurobehavioral aspects: formaldehyde was present in low concentrations; however, for extended work periods—seven days a week.

Work shifts: eight hours a day, seven days a week, one day off a month. In some cases some workers worked seven ten-hour days.

The permissible exposure limit, as I previously indicated, is based on an eight-hour work day, 40-hour work week, not designed to protect all workers.

Some work areas had poor ventilation and discomfort and heat stress.

Skin contact: no gloves immediately, difficult to work with gloves.

Workers reluctant to report health problems.

According to a news report, when the phenol formaldehyde resin was removed and ventilation was added, the health problems were reduced.

I can't help but conclude that this type of an environment, including the chemical and the non-chemical factors, certainly played a significant role in the symptoms that these people experienced.

Senator REID. Thank you all for your testimony.

I have some questions.

Doctor Baker, you have given us the statistics for the 100 patients. Do you think the additional 30 or 35 patients you have seen would fit the same standards that you have given us previously?

Dr. BAKER. Yes, sir, they will.

Senator REID. Doctor, it is my understanding that you were asked but declined to serve on the independent medical claim review panel assembled to review the claims of the Boeing workers. Why did you decide not to join that panel?

Dr. BAKER. I felt that my duty was to my patients. I felt that the panel would be a pure white-wash panel that had come to its conclusion before even seeing one patient; namely, that there was no problem. And I did not feel I would serve my patients' interests by having anything whatsoever to do with such a panel.

Senator REID. Your medical background—Georgetown, and then you received special training at Harvard? or do I have it backwards?

Dr. BAKER. George Washington and—

Senator REID. Did I say Georgetown?

Dr. BAKER. Yes.

Senator REID. I was just thinking about them. They lost a ball game here yesterday.

George Washington, and then you had additional training at Harvard?

Dr. BAKER. Yes.

Senator REID. Tell us, prior to your receiving so many of these patients, what your practice consisted of. You treated allergies?

Dr. BAKER. Yes. I have a general allergy practice, and I would say 95 percent of my patients are typical allergy patients with hay fever, asthma, hives, food allergy. But about five percent are industrial problems or people with chemical exposure. So I have been well aware of the problem. But I have never seen such an enormous number of patients in such a short time.

Senator REID. Doctor, when I practiced law I did trial work and I did a lot of work for insurance companies. We try to pin down the plaintiff to find out the difference between their subjective and objective complaints; that is, the things that they could tell us that couldn't be seen and those that you couldn't controvert because they had a broken arm or a cut or something like that.

You have indicated in your testimony here today, at least the way that I understand it, that with these patients there are things that you can see that you can't controvert. They have rashes on their skin; is that right?

Dr. BAKER. Yes, sir.

Senator REID. And what else can you see that the patients couldn't make up?

Dr. BAKER. Their eyes may be red if I get them right after work. They are having nose bleeds which you may see. Their nasal mucus membranes are red and inflamed. Their throats may be red. A lot of them have abnormal lung function tests, which may or may not be related to smoking. In fact, some of the non-smokers have abnormal lung function.

Senator REID. And, it is my further understanding that, because you wanted to determine further what their complaints consisted of, you have conducted a number of tests to find out, for example, one word you used was "organic brain poisoning." Are there tests that can be run to determine that?

Dr. BAKER. Yes. A neuropsychologist can perform a series of tests to measure function. Obviously we can't look inside the brain, *per se*, but we can measure brain function.

These tests are supported by, apparently, an international body of scientific knowledge. The psychiatrist who has performed the test on some of the patients assures me that it would be impossible to malingering on these tests unless you happen to be a psychologist who knew the makeup of these tests.

He didn't have the data put together for me for today, but I talked to him and he said that this group of patients shows the worst brain damage he has seen in any group of patients.

Senator REID. Doctor, the panel that you declined to serve on concluded that the symptoms reported by the Boeing workers were medically credible, but that many didn't correlate with work place exposures at the plant. Could you give me, based upon your having seen 130 of these patients, your views and criticisms of these findings?

Dr. BAKER. I think they correlate directly with working at the plant. I have case after case, such as a 21-year-old who lettered in three sports—football, baseball, and basketball—in high school who was flat on his back for about a year. This happened directly after August or September of 1987 when phenol formaldehyde resins were introduced in the 1702 plant where he worked.

This person, incidentally, had been seen by half a dozen different competent physicians, including the University of Washington, one of our big clinics. All sorts of tests were run which didn't show a thing which you would expect because they did not do the immunological tests.

And I have, again, another man who was a city marathon champion in his high school days who has dementia now. He doesn't know who he is, where he is, the names of his children.

To sum this up, we have a patient history of certain good health or physical achievement. I have a couple of ex-Marines in my practice. From what I have heard of Marine training camp—I have a son who is there now—there is no way these people could be U.S. Marines today. They are literally paralyzed in their functioning.

So we have the time cause and effect. Prior to exposure my patients were healthy people. During exposure they got ill. Their patterns and their diseases are similar; while all the patients may not have all of the same symptoms, when you look at the pattern it is a rather stereotype pattern. Their respiratory irritation tends to clear up away from work, and the organic brain syndrome is just not to be expected at all.

I hope that answers your question.

Senator REID. Mr. Breysee, I think your testimony was excellent, but the main thing I got from it is that you feel that these people's condition may not have occurred had they not been working these extended hours. Is that what you are saying?

Mr. BREYSEE. That is certainly one of the aspects of it.

Senator REID. At least that was an aggravating factor?

Mr. BREYSEE. That's an aggravating factor, undoubtedly.

Senator REID. I appreciate everyone's testimony here.

I think the record should also reflect that the committee is unable to expend large sums of money bringing witnesses to and

from various parts of the country for hearings like this, and I'd like to indicate that we weren't able to pay Doctor Baker's way back, and so he is coming at his own expense, which is appreciated by the committee.

Thank you very much.

The next panel of witnesses consists of: Doctor Robert Balster, on behalf of the American Psychological Association from the Medical College of Virginia; and Doctor Alan Broughton, Antibody Assay Laboratories, Santa Ana, California.

Doctor Balster and Doctor Broughton, we welcome you to the committee today. We appreciate your patience.

[Witnesses sworn.]

Senator REID. Doctor Balster, please proceed.

STATEMENT OF ROBERT BALSTER, MEDICAL COLLEGE OF VIRGINIA, ON BEHALF OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

Dr. BALSTER. Thank you very much. I appreciate the opportunity to appear here today and provide testimony on this important matter.

I am a professor of pharmacology and toxicology at the Medical College of Virginia in Richmond, and I am here today representing the American Psychological Association.

I am a psychologist, and I have an interest in the effects of chemicals on human behavior and functioning.

The American Psychological Association has a total membership of 90,000 psychologists at the doctoral level. The APA has been following various issues that relate to these hearings over many years.

Many of the symptoms that you heard described this morning are symptoms that relate to the nervous system and behavior. As I'm sure you know, there are many chemicals in the environment and in the work place that can cause neurobehavioral effects such as those effects which were described earlier by the first panel. Although it is possible that these effects may have been due to phenolic formaldehyde exposure, as was suggested by a previous speaker, one of the other witnesses indicated that there were many chemicals in the work place environment there that are essentially of unknown toxicity that may have been responsible.

It is the latter possibility that I'd like to focus your attention on this morning: issues related to the unknown toxicology of chemicals in the work place and some steps that might be taken to try to prevent exposure to unknown or unestablished neurotoxicants.

Senator REID. Your entire written statement will be made part of the record. If you could summarize that in seven minutes that would help us.

Dr. BALSTER. Yes, I will. I do have a long statement, and I would appreciate it being included in the record. I will summarize the main points.

Essentially there are three points. The first one I just made, and that is that there are many, many chemicals that can affect the nervous system. Obviously, the nervous system is a very sensitive organ to chemical exposure.

The second point relates to the way in which we would prevent exposure to neurotoxicants in the environment and in the work place. As you know, the primary legislation that would be important in this context would be the Toxic Substances Control Act—TSCA. I understand that someone from the EPA's Office of Toxic Substances will be describing TSCA to you later in the hearing, so I don't need to go into detail on that here.

The primary idea behind TSCA is to identify chemicals that might have toxic effects and reduce undue risk due to human exposure.

We have some concerns in the American Psychological Association about the effectiveness of this legislation. You see various estimates, but many believe that there are approximately 65,000 chemicals in the environment and work place to which humans can be exposed. A very large proportion of these chemicals have never been evaluated at all for any type of toxicity, including neurobehavioral toxicity. My written testimony provides some information from a National Academy of Science's report that contains figures on how many of these chemicals are actually tested. I'm sure you will be hearing more about that from the representative from EPA today; but it is important for you to know that a large number of chemicals that are used in industry and commerce have never been evaluated for any type of neurobehavioral effects.

It is my general impression that on a yearly basis roughly 15 or so chemicals would be required through TSCA to be evaluated for some type of neurobehavioral toxicity out of the 1,500 or 2,000 new chemicals that are submitted each year.

So the way the TSCA would work is that the safety of chemicals identified as of concern for potential neurobehavioral toxicity would be evaluated using a battery of animal tests. My written testimony provides you some information as to what is in these tests and what they are designed to measure. They are a reasonable way to identify serious neurotoxicants.

The problem, in our judgment, is that they are not being applied frequently enough and effectively enough. What we need is some improvement in the implementation of TSCA, possibly through some legislation that would strengthen this act. I note that Senator Durenberger a couple of years ago had sponsored some legislation that we were very supportive of that would have strengthened TSCA. I'd very much encourage you and this committee to consider legislation along these lines that would improve the ability of TSCA to prevent neurobehavioral toxicant exposure.

The final point I'd like to make has to do with the absence of data on neurobehavioral toxicants. There is a very small amount of data on the neurotoxic potential of chemicals in the work place. In large part this is due to the lack of federal support for research in the area of neurobehavioral toxicology. Much of this support, of course, would come from the Environmental Protection Agency, both for its intramural program at the Health Effects Research Laboratories, and also for grants and contracts to outside investigators. There has been an appalling diminution of support for extramural research by EPA over the past few years. Again, the written testimony provides you with some facts and figures about the pattern of research funding at the Environmental Protection Agency.

We need to see an increase in research and development activities in this area to create the data base that would allow us to develop better tests and to allow us to predict which kinds of chemicals we should be preventing exposure to.

With that, I will conclude my remarks.

Thank you very much.

Senator REID. We will have some questions for you later.

Doctor Broughton?

STATEMENT OF ALAN BROUGHTON, ANTIBODY ASSAY LABORATORIES, SANTA ANA, CA

Dr. BROUGHTON. I also appreciate having the opportunity to address the committee, and I would like to make some remarks in addition to my written testimony.

I am a board-certified anatomic and clinical pathologist, and I have got over 30 years of experience in medical research—initially with the Royal Air Force in my native land, and then in 1973 with the University of Texas Medical School in Houston in my adopted land. Over the last few years I have been in private practice of laboratory medicine in Southern California.

It is not surprising, then, that as an author of many papers, most of which relate to the use of immunological techniques to diagnose human disease, I became interested in a paper that was published in the *Journal of Laboratory and Clinical Medicine* by Patterson from Northwestern University.

He described a method for detecting antibodies—not formaldehyde, itself, but antibodies through formaldehyde conjugated or fastened to human protein. In my laboratory, we perfected this technique for use in routine work.

Since that time we have studied over 300 patients. This study, some of which has been published in five scientific papers which I have submitted to the committee and add to my written testimony.

Senator REID. They will be made part of the file of this hearing.

Dr. BROUGHTON. Thank you, sir.

All this research was self-funded. There was no outside funding involved. We showed that the patient—initially individuals exposed to high levels of formaldehyde, but lower than the OSHA standards, i.e. less than one part per million, living in mobile homes, often retired people who bought the mobile homes to retire to, developed symptoms of which I have listed in my written testimony, and also are almost identical to the symptoms that the Boeing workers complain of.

We demonstrated high levels of formaldehyde antibodies in the majority of these patients, but also demonstrated other features which were even more fascinating than just detecting antibodies which, after all, only indicates exposure and little else. No disease processes.

We demonstrated one at a high percentage—over 75 percent of these patients had one or more antibodies to their tissue. This was a dilution of 1/20, which is a relatively high concentration of serum, which means very little antibody was present. But, nevertheless, it was significantly more than the normal population would have.

Further, we showed the presence of a marker on the human lymphocytes, a protein which these patients expressed and normal individuals didn't.

This protein has been described in patients with multiple sclerosis, in patients with recent onset of juvenile diabetes, and has also been described in patients with autoimmune thyroiditis. And it is considered to be an indication that there is activation of the immune system from some cause.

Then we also studied the secretion of interleukin-1, primarily because in many of these patients the first symptom that we could detect was the presence of a flu-like illness, and interleukin-1 is an example of a material produced by the human immune system which produces the symptoms of flu; that is, pains in the joints, headache, and fever.

We found that some of these patients, indeed, secreted high levels of interleukin-1 from their cells; other patients hardly secreted any. We don't know the significance of this as yet, but that is one of the areas of constant research in the laboratory.

We have also studied the effect of exposure to patients working in office buildings. These patients develop antibodies to formaldehyde and also to another chemical which is used as a plasticizer, as Doctor Baker mentioned earlier. Again, these individuals also exhibit the autoimmunity and exhibit the activated immune system.

This work needs to go on. It is far too early to make any concrete statements as to what the situation is and what the disease process is and what the ultimate disease will be in these individuals. However, if we turn our backs to it and say there is no problem here we may end up, in a few years time, with patients with severe disease.

Thank you, sir.

Senator REID. Thank you very much.

I note in your written statement, Doctor Broughton, that you state that Doctor Goldstein, professor and chairman of the Department of Environmental and Community Medicine at Johnson Medical School in New Jersey states that, The amount of funding from the government for research and environmental health is so small that it precludes the development of faculty strength, which also perpetuates a lack of knowledge in the primary care physician. Would you elaborate on that statement?

Dr. BROUGHTON. The training of the primary care physician in environmental medicine in medical school is nil, virtually, or very scanty. So that when a physician goes out into practice he has no knowledge of the effect that the work place or living in the 20th century can have on individuals.

Senator REID. Don't you think, Doctor Broughton, that this is the main reason that you and a physician like Doctor Baker are ploughing new ground, so to speak, and a lot of the medical community is asking what you guys are doing because they have had no experience in this area? Is that true?

Dr. BROUGHTON. That could well be true, sir.

Senator REID. Let me ask you directly: are antibody assays generally accepted as reliable markers of chemical over-exposure?

Dr. BROUGHTON. The presence of an antibody is a reliable index of exposure if it is the flu, measles, or any other bacterial or viral diseases. Whether it is still recognized widely as a marker for expo-

sure to chemicals is debatable. That is one of the reasons we are publishing all this work and literature to get it accepted.

Senator REID. Doctor, would it not also be the case that, prior to it being acceptable as a reliable marker, you would have to get a good history from the patient?

Dr. BROUGHTON. That is very true. Yes.

Senator REID. Because if someone had had the antibodies present and had never been exposed to these chemicals, then you would expect it came from some other source; is that right?

Dr. BROUGHTON. That's absolutely correct. Yes.

Senator REID. Would you tell the committee, in laymen's terms, what you mean by these antibodies? What are you talking about?

Dr. BROUGHTON. When a biological organism—human, dog, rabbit, horse—meets up with a foreign chemical in its body, usually that is a virus or a bacterial infectious agent. It is recognized by cells in the body as being different and not being part of the body. Therefore, chemicals are produced by the cells themselves to destroy the invading organism.

A good example is immunization. Immunization is injecting the chemical inert, which is de-activated so it doesn't produce the disease, into a patient. That injection would produce the antibody against that disease as protection against the disease.

Senator REID. And so this is the body's natural reaction to try to rid itself of a foreign substance?

Dr. BROUGHTON. Absolutely.

Senator REID. One of the things that you, Doctor Balster, talked about is there simply being—and this is confirming what Doctor Broughton just said—not enough standards set by the government to mandate testing conducted on a periodic basis; is that right?

Dr. BALSTER. That's correct. The way TSCA operates is that essentially the burden of proof is on the government to require data. In other words, if a company submits a pre-manufacturing notice on a compound with no information on it at all, then the government is very hard-pressed to generate a case that data is needed. In other words, the burden of proof falls on the EPA to require additional safety information. So, yes, an inadequate number of chemicals receive any type of testing at all.

Senator REID. Industries that manufacture medicines have the burden of safety before they are approved by the Federal Food and Drug Administration; isn't that right? The burden falls on the private sector?

Dr. BALSTER. Precisely.

Senator REID. Whereas you are saying that in the chemical industry it falls on government?

Dr. BALSTER. Right.

Senator REID. Would there be any reason we couldn't do the same with chemicals that we do with medicines?

Dr. BALSTER. That would be a direction along which I would like to see some legislation. I'd like to see the burden shifted a little bit towards the submitter of chemicals in terms of at least a requirement for minimal toxicology data. I also think what is needed is to provide EPA's offices the type of financial and other support they need to better implement existing legislation in order to conduct more testing.

Senator REID. Doctor Broughton, would you agree with that?

Dr. BROUGHTON. Yes. I think it might be fair to say that with the knowledge we have now, perhaps formaldehyde resins would never have been made if they had to go through the FDA, which all of the drugs made in this country have to do. I would heartily support that.

Senator REID. The chemicals that we have been talking about, Doctor Balster, are compounds associated with advanced composites, which include phenol formaldehyde, numerous other things, and MDA. Now, you sat here today and watched these five women testify. Lori Liberty—and I'm sure she doesn't always like to be pointed to as an example, but I think she is the classic in this instance. Would you indicate whether, based upon your experience as a professor of pharmacology and toxicology, whether the symptoms these women have talked about, as illustrated by Lori Liberty sitting here before us, would the neurotoxicity of these chemicals evidence themselves in the women that we have had testify here, including Lori Liberty?

Dr. BALSTER. I would certainly agree that it seems very possible, if not likely, that the types of symptoms you have heard could be due to neurobehavioral toxicants. I would be reluctant to ascribe them to particular chemicals without complete evaluation.

Senator REID. Of course.

My point was: with your experience, the conditions these women have could be a result—I say "could be"—of what you have indicated.

Dr. BALSTER. Yes, from exposure to known or unknown neurobehavioral toxicants.

Senator REID. The committee needs to know if the symptoms that these women are talking about and Lori Liberty has, are certainly not contrary to what you have studied about what these chemicals will do to a person's mind?

Dr. BALSTER. Absolutely not. In fact, table I and figure I of my written testimony gives you lists of signs and symptoms that commonly accompany neurobehavioral toxicant exposure. You will see these women's signs and symptoms listed there.

Senator REID. Your testimony has been most helpful, and I'm sure that this won't be the last.

Thank you both very much for your testimony here today.

The next panel of witnesses will be from the Boeing Company and Lockheed Aeronautical Systems Company. Boeing will be represented by Vice President for Human Resources, Mr. Joseph Peritore; Lockheed by Mr. Dale Daniels. Mr. Peritore is from Seattle; Mr. Daniels is from Burbank.

[Witnesses sworn.]

Senator REID. Mr. Daniels, would you proceed?

Mr. DANIELS. Pardon me if I cough. I have a head cold coming on.

Senator REID. You've been hanging around those plants too much.

Mr. DANIELS. I do spend a lot of time in them.

Senator REID. Please proceed.

STATEMENT OF DALE H. DANIELS, EXECUTIVE VICE PRESIDENT,
LOCKHEED AERONAUTICAL SYSTEMS CO.

Mr. DANIELS. Thank you for including me in this forum. I, like you, am very concerned about the health and safety of our employees—not only the ones that we have heard from today, but everybody in the plant.

I want to be a party to any constructive approach to the very serious subject of providing a safe and healthy work environment for America's work force.

Senator, I do not think I am the average office-bound vice president. Forty-six years ago I started work at Lockheed in the factory floor running a hydraulic press, and I have spent many, many hours in the shop over the last 35 years.

We have all heard that people are the greatest resource. I find this, in my experience, to be true. They are the best investment you can make. You can't buy a machine equal to a human being. Period. They can make or break the company.

Years ago I found that a wall had been built up between the work force and the management in the Lockheed factory. I listened to what the employees had to say, knocked the wall down, and we began to make real progress in a very safe and healthy manner.

That same work force is vital to us in another way. It is how we compete, how we win, and how we perform on the contracts we get.

But, having said all that, it seems to me the issue before the panel today is: what are we not now doing that we should be doing? I have broken it down into three areas: technical, physical, and psychological.

I believe we can whip the first two—the technical and the physical—with the state-of-the-art knowledge we have got today—what to do about analyzing the materials we work with, what to do to wear protective equipment or apparel or whatever to protect ourselves against them.

I think the third is going to take a little bit more time and it is going to require some of the suggestions and actions you have heard here today.

Like any complex problem, it requires attention to detail and clear, effective communication. Every time I have been sent anywhere in our corporation to fix a problem it is because either attention to detail or clear, effective communication has broken down.

I think, with rare exception, in this case not many more regulations are required. I really do endorse, though, the finding out more about the materials—long-term and short-term effect. But I think, fundamentally, horse sense in this case makes good business sense. But it is like anything else. It only makes good business sense if it is applied.

Now, recently, as you know, OSHA came through our facilities in Burbank. To me they were like a new set of educated, well-trained eyes—very pragmatic people. They found several specific cases and said we mean these and all things like these. What they really said was, "Clean up the place and fix the obvious."

They did not say, however, that what we were doing was inherently unsafe provided that you did follow the procedures, the train-

ing, and wear the required equipment. Again, attention to detail and clear, effective communication.

Knowledge, in my opinion, of the real short- and long-term effects is one of the things this committee could do. What I have done, though, in my factory, if you want to look at it that way, is say, "Look, if you don't know it is safe, don't do it."

And I have personally gone around to a lot of the work force to tell them that because I am amazed by the stories I hear that they try to raise it to the management and they get told to go to work. I can't believe it. The management all has wives and children. So I will go around and tell the work force, "If you don't know it is safe, don't do it." And I am telling the management, "If you ask him to do something that is unsafe, he is going to tell you he is not going to do it. And if you raise hell with him, I'm going to fire you." That's what I call clear, effective communication, especially if I get out there a lot.

I have got so many staff advising me on what to say here, but anyway, it is kind of like my dad telling me about stealing. He said, "One thing, son. If you don't know it is yours, don't pick it up. That's how you don't steal something." Now, I'm telling you that if you don't know it is safe—because I have asked a lot of people in the factory if they know that is safe. Well, he says, "I don't know it is unsafe," and I said, "No, no, no. If it is not safe, if you do not know it is safe, don't do it. And if your management tells you to do it and we don't know if it is safe, don't do it. And if both of you want to come and see me, come in."

I think the third and key thing is proper medical examinations and monitoring. Specific knowledge about both what you are working with, the manner in which you are working, and complete feedback to and from the employees—what I have found in some of my discussions is that they were not getting complete feedback, so obviously they imagined the worst and feared the unknown. It is a very natural reaction. None of us would walk into any chamber where somebody said, "Don't worry, whatever is in there is breathable."

I think people worry about it to the extent they get ill from the fear of doing it when you do not provide effective feedback to them—just like you and me.

In summary, I think that most of the regulations you have got, if applied, cover most of the situations. I can see a real need for a more specific MSDS system that gets it into Ma and Pa language, that says to the worker, not in all this toxicologist lingo, but in Ma and Pa language, "This stuff will do the following to you. Protect yourself against it in the following way."

It is kind of like around the plant. I have told them I want signs with pictures up. If you are doing this process in this station you must wear this gear. It gives me a very clear case of communicating with the employee and expecting the management to see to it. You can walk by it.

Attention to detail every time. Every time I have ever been anywhere that we didn't do that we got in trouble.

In conclusion, I think yes, there are risks. It is kind of like boating. If you don't do it right, it will get you. You may drown, you may drown your whole family.

I don't think it is unique to the aerospace industry. I think it can be controlled and fixed. In the absence of the knowledge that you have heard we do not possess about the long-term effects, I say guard completely against it. And if you don't know it is safe, don't do it.

I want to be a party to a solution. I'd be glad to work with somebody in a construction approach to it. I am concerned about these people. I have been in some of these buildings I have heard described this morning. I am amazed at the comments I have heard.

Senator REID. Thank you very much, Mr. Daniels.

Mr. Peritore?

STATEMENT OF JOSEPH F. PERITORE, VICE PRESIDENT, HUMAN RESOURCES, THE BOEING COMPANY

Mr. PERITORE. Thank you, Mr. Chairman, for the opportunity to share our perspective upon a health and safety issue at one of our plants.

I want this panel to know that Boeing has been and will continue to be concerned about the well-being of all our employees.

In 1986, the FAA issued a set of fire-worthiness standards for airplane cabin interiors. Boeing set out to find a new material that would burn slower, produce less heat and smoke. They have tested several. The material we chose was fiberglass impregnated with a resin that binds the fibers together. The resins contain phenol formaldehyde.

Both these chemicals, as you have heard today, have been used in industry for quite a while. The two have frequently been used together as a resin.

Over the course of many years, standards for the safe handling of phenol and formaldehyde have been established. Throughout this entire episode at Boeing, we not only met, but significantly exceeded the standards for safety on these materials.

These are materials used to create composites. They have some toxic properties and present some risk, but they can be used safely. If you are a responsible employer—and Boeing is—you find methods and processes to protect your workers. Always the objective is safety.

To that end, we tested this particular material carefully before we chose it. We tested it again during pre-production using worst-case situations. In every test, the phenol formaldehyde concentrations were well below government safety standards.

In August of 1987, production of cabin parts began. At that time, air-borne concentrations of both phenol and formaldehyde, in the composite work area, were consistently less than ten percent of the acceptable limits.

Why, then, did some of our workers become ill? I don't think anyone in this chamber knows for sure. We do know that early in the production phase some employees objected to the material's strong odor and that others complained of skin irritation. These are not unusual reactions when a new material is introduced into the work place. Some employees, as we have heard, also, are more sensitive than others.

But a few workers expressed concerns about the materials' affect on their health. Because of that, we continued to test the air. The levels of phenol and formaldehyde remained low.

We sent samples of the material to the University of Washington and invited state and federal inspectors to visit the plant. The concentrations of these chemicals were barely detectible.

Because of on-going employee complaints we provided respirators, even though none of the concentration levels warranted the devices. Later we designed an auxiliary ventilation system and exhaust booths for handling the material.

Concentration levels remained extremely low, but worker complaints continued. To address these concerns, a joint union/management committee was formed acting as an ombudsman for employees, providing communications and information, identifying problem areas, and facilitating medical benefits claims.

The joint committee brought in an outside expert, and will also be sponsoring university-level research on this problem.

Boeing continued its own program of communication with employees, including a confidential worker hotline. During this time, a few of our workers took their complaints to the newspapers. Doctor Baker, who has testified today, had diagnosed several of these workers and was prominently featured in the stories.

Doctor Baker did visit the plant area, and we invited him to share with us his understanding of the scientific causes for our employees' symptoms. Unfortunately, he refused.

Under the State's Workman's Compensation Act, an independent medical panel was commissioned to evaluate the medical claims of our employees. The panel was chaired by Doctor Patricia Sparks of Providence Medical Center in Seattle. She selected a team of five physicians with specialties in internal medicine, psychiatry, allergy, and immunology.

Doctor Baker had diagnosed some of our workers as having formaldehyde poisoning. Doctor Sparks' panel, reporting in January of this year, found no evidence to support that diagnosis.

The panel did find some skin and upper respiratory irritation related to chemical exposures. The panel also diagnosed the majority of the employees as having, "anxiety and depression." These conditions, the panel said, had not been previously diagnosed, nor were they being treated.

Senator, when medical doctors disagree, our employees are hard put to know who is right. The fact that we believe the material was safe became irrelevant. In the highly-charted atmosphere that existed, we felt the only way to alleviate our employees' concerns was to remove the material from the shop altogether, and that is exactly what we did.

Mr. Chairman, we ask your help. Boeing is not alone in facing this issue. As a strategic concern, American aerospace depends on new technologies and new materials. But, at the same time, our employees depend on us to protect them from harm, to mitigate the risk that is inherent in the introduction of new processes and materials.

Our workers' concern is very real and very important. Employee safety has always been Boeing's first priority and it always will be.

I am here as a Boeing representative, but I also chair an Aerospace Industry Association Committee on Composites. It is currently working on this problem and sharing information with the Air Force and the suppliers of composite materials.

I urge this subcommittee to engage the best minds in medicine and science, as well as the talents of material manufacturers, aerospace companies, unions, and the nation's regulatory agencies. We must find a creative, collaborative solution.

The material and processes that can create the aerospace breakthroughs in the future are waiting to be discovered. When we find them we need to be able to use them safely, effectively, and with the full confidence of our employees.

Thank you.

Senator REID. Mr. Peritore, I have a couple of questions.

First of all, you saw these five people testify, some of whom were from Lockheed, some from Boeing, and you have heard Doctor Baker testify about the 130 people that he has seen.

As I understand your testimony here today, you have indicated that the Boeing people have stated that, other than some mild upper respiratory problems, they have no physical symptoms—the patients that you have seen that have been exposed to this. Is that what you said?

Mr. PERITORE. Doctor Sparks' panel says that these people are ill.

Senator REID. But I thought I heard your testimony say that their problems were emotional in nature?

Mr. PERITORE. I didn't say that.

Senator REID. Tell me what Doctor Sparks said, then.

Mr. PERITORE. That they have symptoms of anxiety and depression.

Senator REID. Well, that's emotional, isn't it?

Mr. PERITORE. She also says that there is further research needed to determine whether any low-level chemical exposures might bring that on.

Senator REID. We sometimes get buried in this world of medical terms and terminology. That's why I have to say, Mr. Daniels, I really appreciated your testimony. It was direct and to the point. Whereas I really have to tell you, Mr. Peritore, I, personally—only speaking for me, not the whole committee—am somewhat resentful of your testimony because it appeared to me that you are not only minimizing the illnesses of these people, but generally saying that you don't know much about it and they're probably not very safe. Maybe that isn't what you meant to say, but that is certainly how it came across to me.

How many employees does Boeing have?

Mr. PERITORE. We have 150,000.

Senator REID. How about Lockheed? How many employees?

Mr. DANIELS. In the area we are talking about, about 32,000.

Senator REID. How many totally?

Mr. DANIELS. We have 81,000.

Senator REID. And it goes without saying that Boeing and Lockheed, in areas where they have a high concentration of employees, play a significant role in the economy of those areas. It is a very delicate thing for the State and local governments when these large companies have such a strong economic base—for lack of a

better word and being real polite about it—for them to step forward and do something about the problems that arise.

I think that is one reason that it has been necessary for Congress to take a look at this problem, because I think, frankly, State and local governments are overwhelmed by, not only the complexity of this problem as it relates to what the doctors are saying and not saying, but also if it creates too much problem people get laid off and it affects the economy.

I understand the importance of these things. It is obvious to me why they are so important. As Senator Warner said previously, we have got to find a way to make the work place safe and also use these products or products similar to this. I think that is the problem before us.

There is a paragraph in your written statement that I think is interesting. On page 13 you make reference to the potential for adverse psychological effects. I'd like to know exactly what you mean, Mr. Daniels, and if Lockheed has any evidence indicating that its workers have experienced this problem with adverse psychological effects.

Mr. DANIELS. I believe that to me it is more like a fear of the unknown. When you ask a person to do something and you can't tell him it is safe to do it, he is bound to have a fear of the unknown. The only thing I think I could have been referring to there is concerns—the same concerns I'd have if somebody asked me to do something and I didn't know it was safe.

Senator REID. Two of the witnesses here today—the medical doctors—said that these chemicals not only cause physical problems, but emotional problems. Certainly that could be—and I'm not saying it is—the cause of some adverse psychological effects. Would you both agree to that?

Mr. DANIELS. Certainly I'm not equipped, of course, to comment medically, but it certainly sounds reasonable.

Senator REID. This is a question to both of you: do you have an estimate as to what percentage of your business is derived from government contracts? First you, Mr. Peritore, and then you, Mr. Daniels.

Mr. PERITORE. It is less than 30 percent.

Senator REID. Mr. Daniels?

Mr. DANIELS. About 85 percent.

Senator REID. I understand that it is possible to prescreen workers for chemical sensitivity through a type of allergy test. Do you know if, in fact, this is possible? And, if so, do you require those tests before you place workers in jobs where they are exposed to chemicals?

Mr. Peritore?

Mr. PERITORE. It is my understanding that you can do tests for sensitivity to dermatitis for various chemicals. We do have in our hiring process a questionnaire that prospective employees fill out that tries to determine whether they are sensitive to these materials.

Also, when we transfer employees between shops we also go through another questionnaire process that tries to identify whether they would have sensitivity to these materials.

But we do not do the actual, physical test that you may be referring to.

Senator REID. Mr. Daniels?

Mr. DANIELS. I would say that our experience is very close to that in terms that we will question them, of course, upon employment as to any problems they have. We will test them for respiratory problems. We will physically look at them to see if they have skin problems—

Senator REID. Mr. Daniels, isn't that what you were referring to when you indicated you saw three problems in this whole area?

Mr. DANIELS. Right.

Dr. BROUGHTON. The technical and the physical—and I assume that this is one of the areas that we could look to in resolving these first two areas that you are concerned about, the technical and physical aspects. A type of testing.

Mr. DANIELS. Yes, that's true.

Senator REID. I recently met with someone who advocates biological monitoring of workers in addition to traditional, environmental monitoring in the work place. I was told that through a simple blood or urine test it is possible to measure the build up of a solvent in the body and measure the rate at which the compound is metabolized.

Do either of you know anything about this test?

Mr. PERITORE. Senator, that's well beyond my understanding.

Senator REID. But I assume—again directing my attention to Mr. Daniels—that if, in fact, something like this is available, Lockheed would be interested in this to solve the two problems that you brought out, the technical and physical aspects of this whole problem?

Mr. DANIELS. Absolutely would be interested in it, Senator.

We do a series of—you know, I didn't come here to barrage you with statistics, but we do a series of hazardous physical examinations, private medical department. We have done them in various numbers running up to 5,000 or so for asbestos, for chemical dust, ether, lead, and that kind of thing. So I believe it is a key in getting to a state where you know it is safe to do it.

Senator REID. Certainly I recognize, as a layman, that even though the companies are large—Boeing and Lockheed—there hasn't been much direction coming from the Federal Government as to what is happening in this field. We have a law that, as indicated earlier, we spend no money enforcing it and do not place the burden on the private sector. We may have to look at that again.

Mr. Peritore, could you repeat for the committee why is it that Boeing is discontinuing the use of phenolic materials discussed here, despite the fact that you say there is no medical evidence supporting the threat to health?

Mr. PERITORE. Senator, I think that gives a good impression of how concerned about our employees' health we are. I am very disappointed if you feel that what I said in any way implies that we are not.

As I tried to list in my opening comments, there was extensive testing of this material, and I think you have heard today, also, where NIOSH and OSHA and others were brought in to do testing.

Nobody found any concentrations that were of any levels that would indicate health problems.

Senator REID. Of course, this was based on standards that were set, in many instances, many years ago.

Mr. PERITORE. Oh, yes. Absolutely.

Senator REID. One of the problems we have with all this is the composites—the mixture of substances. one substance by itself might be fine one same with another, but when mixed together could possibly form a substance that would be harmful to anyone working with it so that is another aspect fo this problem.

Mr. PERITORE. Clearly we are dealing with the science available today. But I do want to say that the levels were so very low, and yet the worker concerns persisted after much communication with both the union people and the employees in group meetings, as you heard today. We could not resolve all their concerns about the health implications, no matter what kind of data we were able to present.

So in the interest of the employees' health concerns—and they are very valid concerns about this impact on their health—we took the material out of production. That was the only reason we took it out of production.

Senator REID. Thank you both very much. We appreciate your testimony.

The last panel today consists of Mr. Charles Elkins, Director of the Office of Toxic Substances of the Environmental Protection Agency based in Washington, D.C.; Mr. Leo Carey, Director of Office of Field Programs, Occupational Safety and Health Administration in Washington, D.C.; and Mr. Gary Vest, Deputy Assistant Secretary for Environment, Safety, and Occupational Health, United States Air Force, Washington, D.C.

[Witnesses sworn.]

Senator REID. Please proceed first with you, Mr. Elkins.

STATEMENT OF CHARLES ELKINS, DIRECTOR, OFFICE OF TOXIC SUBSTANCES, ENVIRONMENTAL PROTECTION AGENCY

Mr. ELKINS. Thank you, Mr. Chairman.

I am the Director of the Office of Toxic Substances in the Environmental Protection Agency, and we have the responsibility, among other things, of administering the Toxic Substances Control Act.

Let me summarize some of the provisions of that act as it relates to the aerospace industry.

The act makes a major distinction between new chemicals and existing chemicals. Let me begin with the new chemcial provisions:

In 1977, when TSCA was created by the Congress, the Congress was acutely aware of the serious consequences of cases where chemicals had been put on the market and used in this society before we realized the need for control—PCBs, phosphates in detergents, chlorofluorocarbons. And so, with regard to new chemicals, the Congress gave us authority to review new chemicals before they go on the market to make sure that they are examined and subjected to appropriate controls before they are marketed. And

today we review about 2,000 new chemicals each year as they come out of the R & D process in the chemical industry.

If these chemicals, as we review them, meet certain statutory criteria, as I indicate in my formal testimony, then we can impose some restrictions in the form of either requiring more data from the company or restricting their use, such as requiring protective equipment.

We have imposed such restrictions in about 10 percent of the cases that have come before us since 1977.

This is not a perfect system, but it is a vast improvement over the pre-1977 situation. But there are certain constraints. We do have only 90 days to review these new chemicals. The companies are required to send us only the data which they have available, and if they don't have it, they don't need to send it to us. They don't need to develop new data for us.

That means that only 49 percent of the new chemical applications which we have received have had any health data associated with them when they have come to us, and only 15 percent of them have had any chronic health data, which is the kind of data we would normally use to look at the long-term effects of these chemicals.

So since we usually don't have the health data we need to make the evaluation on that specific chemical, we try to identify similar chemicals or analogs on which we do have data and analyze the new chemical based on the similarities to these existing chemicals.

My testimony goes into some detail about how we make those decisions.

We have received about 12,000 of these applications or notifications since the act was passed; 33 of these have specifically had as an in-use identified in their application specific to the aerospace industry.

We have screened each of these chemicals, but in each case the scientists did not believe, in the case of these 33, that there was sufficient basis for any regulatory action, and so they have been allowed to be manufactured as proposed by the companies.

Turning then to existing chemicals, as contrasted with the new chemicals, instead of a universe of 2,000 per year, we start with a universe of about 65,000 chemicals which are now in existence. The challenge is to identify those which pose an unreasonable risk.

This means we need to sort through these chemicals. To do that we need data. TSCA does give us tools to get some of that data.

First of all, we have the authority, under certain circumstances, to require testing at industry expense of these chemicals. We have already received about 700 such studies as a result of our regulations. At least 11 of these chemicals are used in the aerospace industry, as well as in other industries.

We can also, under section 8 of the act, require industry to send us data which they already have in their possession. Under section 8(a), they are required to send us production, use, and exposure data, and we have received that information for 450 chemicals under our regulations, at least 20 of which are used in the aerospace industry.

Under 8(d) of the act, companies can be required to send us health and safety studies which they have knowledge of related to

specific chemicals. We have asked for these studies with regard to 400 chemicals, 25 of which are used in the aerospace industry.

Finally, under 8(e) of the act industry is automatically required, within 15 days from their coming into possession of new data which reasonably indicates a substantial risk, to send that data to us. We have received, over the history of this act, 750 such studies, several for chemicals used in the aerospace industry, and they are listed in my testimony.

Once we identify existing chemicals which need further regulation we have authority, under the act, to regulate them. Our regulation of existing chemicals is different from new chemicals. For new chemicals we are dealing with situations where these chemicals have not yet entered the market; consequently, the near-term economic and social impact of regulation is inherently limited.

When we turn to existing chemicals, we are dealing with, in many cases, chemicals which are well established and have major roles in the economy, so to place significant restrictions on the use of these chemicals requires us, as the act specifies, to do an extensive analysis of options and impacts. But once we can make the regulatory findings under the act we do have a very broad set of authorities which we can impose.

In some cases, Mr. Chairman, the chemicals which we come across and decide that they have unreasonable risk have, in fact, a major piece of their risk occurring in the work place. In those cases, the act requires us to refer this matter to OSHA for them to have the right of first refusal to regulate this chemical. If, in fact, OSHA were to determine that we were incorrect and there was no unreasonable risk, then that would be the end of the matter. But if they agree with us that there is an unreasonable risk, then they are to proceed under their act to regulate these chemicals, and only if they do not, do we have authority to proceed on our own.

We have referred to them, back in 1985, the chemical MDA, which is a major chemical used in the aerospace industry, and they are proceeding to write a regulation limiting exposure to this chemical.

Thank you.

Senator REID. We will have some questions for you at a later time, Mr. Elkins.

Mr. Carey.

STATEMENT OF LEO CAREY, DIRECTOR, OFFICE OF FIELD PROGRAMS, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Mr. CAREY. Thank you, Mr. Chairman. Thank you for the opportunity to discuss the activities of the Occupational Safety and Health Administration to protect workers in the aerospace industry.

I am Leo Carey, Director of OSHA's Office of Field Programs, which coordinates the agency's activities at its ten regional offices.

Like you, Senator, as a young boy I experienced the effects of occupational injuries and illnesses. I come from a small town in the anthracite region of Pennsylvania. I have had relatives killed in the mines, and I have had relatives develop black lung. I have

spent the 20 years of my professional life devoted to protecting workers from injuries and illnesses.

OSHA has responsibility for approximately 80 million workers in nearly 6 million work places. We are largely a field organization with an annual budget of approximately \$250 million and a total staff of 2,400, more than 80 percent of whom are located in ten regional and 87 area and district offices throughout the country.

Our mission is to assure, so far as possible, safe and healthful working conditions for every working man and woman in the nation.

Our enabling statute, the Occupational Safety and Health Act of 1970, gives us broad authority to carry out that mission.

OSHA is authorized to issue occupational safety and health standards and to conduct inspections to enforce those standards. The agency is also authorized to undertake a variety of assistance programs.

For example, upon request we provide free consultative visits to small business employers, offer education and training grants to labor unions and trade associations, and provide incentives for voluntary programs in which employers and employees work together to reduce work place hazards.

The OSH Act encourages the states to conduct their own federally-approved job safety and health programs. Twenty-three states and three jurisdictions have exercised that option.

California is a special case. For the past year and a half, federal OSH has been enforcing the OSH Act in California following a dispute between the governor and state legislature over funding. The issue has now been resolved, and plans are under way for the State to resume full enforcement responsibility for its own private sector program by the end of the fiscal year.

Before I describe OSHA's inspection at the Lockheed plant in Burbank, California, it might be useful to tell you something of our basic inspection procedures.

OSHA inspections are usually conducted without advance notice. Employees or their representatives have an active role in the inspection process. They are present at the opening and closing conferences, and accompany the compliance officer and employer representative on a tour of the plant, which may cover all or part of the establishment.

In the course of the inspection, the compliance officer points out to the employer any unsafe or unhealthful working condition and discusses possible corrective action.

The compliance officer also examines the records which employers are required to keep of workplace-related deaths, injuries, and illnesses, as well as any records of required monitoring of employee exposure to toxic substances and harmful physical agents.

At the closing conference, the compliance officer explains all the apparent violations for which a citation may be issued or recommended, and informs the employer of his appeal rights. It is up to the local area director to determine whether any citations will be issued and any penalties proposed.

If a citation is issued, the employer must correct the cited hazard by a date which is specified in the citation unless he contests OSHA's findings before the Occupational Safety and Health

Review Commission, an independent adjudicatory body. Commission rulings may be appealed to the United States Court of Appeals.

In the past fiscal year, federal OSHA and the states, together, have inspected approximately two and a half percent of the six million workplaces covered by OSHA. Of federal OSHA inspections, nearly half are agency-initiated or programmed inspections. The remainder aren't programmed; that is, they are conducted in response to reports of imminent dangers, catastrophes, and fatal accidents, employee complaints of alleged hazards, news media accounts of accidents or other workplace safety and health problems, and referrals by other government agencies, more or less in that order of priority.

The OSH Act requires OSHA to investigate all formal complaints; that is, signed complaints from employees or their representatives alleging that there is imminent danger or that a violation of OSHA standards threatened them with serious physical harm.

The subcommittee has asked OSHA to discuss its recent investigation of the Lockheed Company's facility in Burbank, California. As you are aware, we have not yet made our decisions on the issue of citations in this case. The on-site phase of the inspection extended from September 29, 1988, to January 31, 1989, when the closing conference was conducted with plant management and union officials. At that conference the inspection team discussed the preliminary results of its inspection, including areas where citations might be issued.

OSHA expects to release its findings soon. Until then, we are unable to discuss the results of our inspection with any specificity. A brief account of the inspection appears in my prepared statement.

I might point out that one of our most experienced industrial hygienists led the inspection, which, as usual, was limited, at first, to the areas mentioned in the employee complaints and press accounts. Three other compliance officers joined the inspection team during the investigation. In all, we have devoted more than 250 work days to the on-site investigation of the Lockheed plant, collected over 200 air and life samples of over a dozen chemicals, reviewed hundreds of cases of employees' injuries and illnesses, and examined dozens of material safety data sheets in our evaluation of the plant's hazard communication program.

Throughout our inspection, we have had the full cooperation of all parties concerned—the company, the Air Force, the unions, and the workers at the plant.

That concludes my remarks.

I would be happy to answer any questions you may have.

Senator REID. Mr. Vest.

**STATEMENT OF GARY D. VEST, DEPUTY ASSISTANT SECRETARY
FOR ENVIRONMENT, SAFETY, AND OCCUPATIONAL HEALTH,
U.S. AIR FORCE**

Mr. VEST. Mr. Chairman, thank you for inviting me to testify. With your permission, I would like to submit my longer statement for the record and summarize.

Senator REID. All statements that have been prepared by all the witnesses will be made part of the record.

Mr. VEST. The Air Force has been, and continues to be, firmly committed to worker protection and welfare. The Air Force is dedicated to assuring a safe and healthful working environment for our workers, regardless of their location.

We have an outstanding worldwide safety and health program that predates the Occupational Safety and Health Administration. We currently have over 4,000 full-time professionals involved in surveillance of our work places. We work very closely with State and Federal regulatory officials to ensure that our workers are protected against occupational exposure.

In my position as Deputy Assistant Secretary of the Air Force for Environment, Safety, and Occupational Health, I have directed the implementation of programs to identify hazardous materials and followed them through the work place to their ultimate disposal.

For example, four years ago I pushed for a scientific advisory board review of hazardous materials in the weapons system development process to see if we could do a better job of recognizing hazards early through involvement of environmental and occupational health professionals.

In the fall of last year, when public controversy began over the potential adverse occupational health aspects of composites in the aerospace industry, I began an inquiry. I raised questions concerning the availability of scientific and technical data on toxicity, health affects, exposure standards, and medical surveillance programs.

I coordinated with the Occupational Safety and Health Administration in its investigation into the alleged problems at the Lockheed plant in Burbank, and I met with OSHA and State of Washington officials regarding the Boeing facility in Washington State.

After reviewing the alleged problems in these plants, the media controversy, and information provided by our health professionals, I was convinced that senior Air Force leadership needed to be informed and involved. I gathered a team of professionals and visited contractor facilities at Lockheed, Boeing, and Northrup to better understand the nature of these problems.

During this visit, I talked with management, labor, and union representatives and asked questions concerning the use of composite materials, how people are protected in the work place, and what medical programs are in place to monitor the health of these people.

My principal concern is with Air Force workers and the potential for exposure to our people when the new aircraft are turned over to us, only one of several clients whose airframes are being designed and constructed in facilities such as the ones I visited.

I concluded from my West Coast visits that, although there are hazards associated with the use of composite materials, they can be managed through quality occupational safety and health programs, including the proper use of engineering controls and personal protective equipment.

Composite technology, as we all know, is not new; however, I believe that occupational safety and health programs could benefit from better information associated with composite processes and the materials that will make up future weapons systems.

Since the potential for exposure to any chemical in the work place is a concern, I thought it appropriate to convene a nationwide conference on the occupational health aspects of advanced composite materials in the aerospace industry. I wanted to ensure that all information about the potential hazards was gathered and thus available for Air Force worker protection. I also wanted to identify where the data gaps are so that industry, labor, regulatory agencies, the research and development community, and the military services can work together to find the answers.

I can say that this was accomplished. The results of this conference were passed to your staff several weeks ago. The conference did conclude that the problems with composites are not unique to the aerospace industry, and that the problems appear to be solvable with current technology.

Mr. Chairman, the Air Force has, I believe, an outstanding occupational health and safety program, and the leadership role that we took in hosting the National Conference on Composite Technology does, indeed, show our dedication to our workers in whatever environment the nation takes them.

Thank you.

I would be happy to respond to questions.

Senator REID. Mr. Elkins, we have heard a lot today about the hazards of formaldehyde. It is my understanding that EPA presently does not have an ambient air standard; is that true?

Mr. ELKINS. That is true, sir.

Senator REID. Why? Or I guess I should ask why not.

Mr. ELKINS. The problems that we have heard about today, of course, are taking place in the work place. That would be the place for an OSHA standard.

EPA's ambient standards, which are normally promulgated under the Clean Air Act, are for the general population, and there are no such standards in place at this point for formaldehyde.

Senator REID. But, from what I have heard here today, it would seem to me that OSHA's job would be made easier if EPA did more testing of these 65,000 chemicals that we have; is that not true?

Mr. ELKINS. That is absolutely correct, sir.

Senator REID. And, Mr. Elkins, since I came to Washington, going on seven years ago, that we in government, are penny wise and pound foolish. We think we are saving money, and we really are not.

We have from some of the witnesses that they reported problems to some of the lower-level bosses, and the bosses were afraid to go to the other bosses for fear that production would be cut back and they might be criticized in some way. I find the same with government.

The point I'm trying to get to: how many people does EPA employ that have the job of finding out what is in these chemicals and how dangerous they are? Do you know?

Mr. ELKINS. In my office, alone, we have about 500 people who work to administer the Toxic Substances Control Act.

Senator REID. It is my understanding that most of those 500 are involved in administrative jobs; isn't that true?

Mr. ELKINS. Not in my office. No. Most of the people are scientists. About half of them are looking at the new chemicals as they come in from the R & D process in the industry. Another good portion of them—I don't have the figures right in front of me—are involved in running the testing program which requires testing by industry, at their expense, of some of these 65,000 chemicals.

Senator REID. I am a little concerned—and I'm sure Senator Lieberman, if he were here, with his one-year-old baby would also be—we have 65,000 chemicals. You can have industry do some work on these chemicals and have done so on 700; is that right?

Mr. ELKINS. We have received 700 studies. I would guess we have maybe twice as many still to come in from industry that we have required.

Senator REID. The point I am trying to make is: shouldn't we be doing more on this?

Mr. ELKINS. Absolutely. I think that we need a lot more testing than we have seen so far. We have been looking for ways of increasing the number of chemicals that we would do testing for under this act. Specifically, we have been looking for ways to require testing on a whole set of chemicals with one regulation, and we have done that now, in one case, and we expect to be able to do it more in the future.

To the extent that we can find common characteristics across a class of chemicals, we can write one rule and require testing for that whole class and receive a lot more testing for the amount of money that the American taxpayer has to pay to get the rule written.

Senator REID. Mr. Elkins, 500 sounds like a lot of people, but let's say half of them are conducting tests or reviewing information submitted by chemical manufacturers. That is not many people to test 65,000 chemicals, is it?

Mr. ELKINS. No. We have only made a small dent in the 65,000 chemicals. Let me say that we would expect that a good number of these would not need testing. Many of these are polymers. But 65,000 is a very large number. We have only begun.

Senator REID. What could we, as Congress, do to give you more tools to handle the problem? We know that with the EPA budget as it is, you'll be lucky to maintain inflation in your department this year. We might need to redirect some of our monies to give you more tools to work with. Tell me what you need.

Mr. ELKINS. Mr. Chairman, no program manager would tell you that he has all the money he needs to run his program.

Senator REID. Some of them do say that just because they want to keep their job.

Mr. ELKINS. Right.

Our budget has dropped from about \$40 million to \$17 million to administer the—

Senator REID. Repeat that.

Mr. ELKINS. From \$40 million a few years back to about \$17 million to run the Toxic Substance Control Act. We have other acts that we now administer within my office, so our total budget is actually bigger than that. But for the Toxic Substance Control Act there has been a substantial cutback during the last eight years.

Senator REID. And new chemicals are coming on line every day; is that true?

Mr. ELKINS. We have a substantial increase each year in the number of new chemicals that are coming into our office. We now, as I indicated, have about 2,000 a year. We started with a few hundred when we started this act.

I would say, Mr. Chairman, that money is not everything, however. One must look at the legal thresholds which EPA must jump over in order to justify a regulation to require testing or control a chemical.

As I look around the Agency at my fellow office directors and see the acts that they are administering, they are administering very different kinds of acts which have much lower thresholds for action than the Toxic Substance Control Act.

Senator REID. Then you feel that if we could change some of those thresholds that would make your job easier?

Mr. ELKINS. Certainly a lot of our time is spent building the case to be able to get over the threshold.

Senator REID. As I indicated to you when I met you earlier today, you and I will spend some time together and we will see what we can do to change some of that.

Thank you very much, Mr. Elkins.

Mr. CAREY, when your team conducted its inspection of Lockheed I think you said you spent 250 work days at it, and the level of cooperation you said was okay; is that right?

Mr. CAREY. I think we would characterize it as better than okay. It was very good.

Senator REID. Fine.

Have you conducted this similar investigation at Boeing?

Mr. CAREY. In Washington State?

Senator REID. Yes.

Mr. CAREY. Federal OSHA has not. Washington State has its own federally-approved OSHA plan.

Senator REID. But I thought you said there was some problem there and they got it worked out. Didn't you indicate that?

Mr. CAREY. No, that was California.

Senator REID. Do you think—and this is going over some ground that I already covered with Mr. Elkins—that OSHA has sufficient resources to fulfill its mission in this area; that is, monitoring complaints with occupational health and safety standards as it relates to these complex chemicals?

Mr. CAREY. I think that we do, Senator. I think most of our agency is a field organization, and most of that field organization consists of safety and health professionals that conduct on-site investigations. Our role is a monitoring role.

Senator REID. Do you feel you have enough resources to do that?

Mr. CAREY. Yes, sir.

Senator REID. Your testimony indicated that you were able to conduct investigations, field studies, of about 2.5 percent of the businesses in the country; is that right?

Mr. CAREY. Yes, sir. Last year.

Senator REID. Is that enough?

Mr. CAREY. Yes, I think it is enough for the role we play. We play, again, a role of monitoring. I think we have a responsibility to oversee what employers do, but I think it is clear, under the Occupational Safety and Health Act, that it is the employer's responsibility for safety and health of their employees. Ours, again, is an audit function or an oversight function.

Senator REID. Which is a different standard than the one that Mr. Elkins has?

Mr. CAREY. If I understand the TSCA Act, that is correct.

Senator REID. I didn't ask that question knowing the answer. You have answered it. You feel that conducting tests of 2.5 percent of the businesses in a given year is okay?

Mr. CAREY. Yes. I think so in the way we conduct them. We try to target our inspections to high-hazard industries. On the one hand, if we have specific information from an employee or employee group or the media or another government agency we will respond to that. In addition, we target our inspections first basically on what we consider to be the worst industries. So although we have a broad mandate to cover all the industries, we target those industries that have the worst safety and health injury and illness records.

Senator REID. You indicated that your findings regarding Lockheed would be forthcoming soon. How soon is soon? A month? Six months?

Mr. CAREY. Less than a month.

Senator REID. Mr. Carey, you said in your written statement that is part of the record that every employer is required to have a written hazard communication and training program; is that right?

Mr. CAREY. Yes, Mr. Chairman.

Senator REID. Are there any differentiations in the regulation based on the size of the company or the number of their employees?

Mr. CAREY. No, sir.

Senator REID. There is something in your testimony that I thought was interesting. You said that the recently-issued standards covering some 300 chemicals apply to all businesses except for the maritime and construction industries, which require a separate rule making. Why is that? Why is it that there is separate rule making for those two industries?

Mr. CAREY. My understanding of the decision in that was that there are unique problems associated with the maritime and construction industries, and that we had the information and data to proceed with the information in the manufacturing and non-manufacturing areas, and we have made a decision to proceed where we could. And we are still considering expanding those personal exposure limits to include construction and maritime.

Senator REID. I see.

Mr. CAREY. We are developing the additional information to be able to do so.

Senator REID. Mr. Vest, this Air Force report cites the need for epidemiological studies, is that not right?

Mr. VEST. The report you are referring to is what, sir?

Senator REID. The report that you submitted. The symposium that you had—

Mr. VEST. The summary report from the symposium?

Senator REID. Yes. That's right. It cites the need for epidemiological studies. Are you familiar with that?

Mr. VEST. Yes, I am. But the statement you cite does not say we need such studies, it says one of the goals of the conference was to determine if they were needed.

Senator REID. Has the Air Force ruled that defense companies conduct this kind of study as part of the introduction of new materials into the work place?

Mr. VEST. No, we haven't.

Senator REID. And why is that?

Mr. VEST. What we are in the process of doing now is prototyping a system at Hill Air Force Base, one of our major air logistic centers, which would give you the correlation between the data bases so that you would have medical histories, work histories, and workplace exposure data which may aid in the early identification of adverse trends.

Senator REID. How long will that take?

Mr. VEST. Probably another year or so before we will have that operational.

Senator REID. Have any of these studies been conducted since the introduction of new chemical compounds into these plants? The answer is no? You said you are setting up a program to do this.

Mr. VEST. We have had, for a number of years, a very extensive occupational safety and health program which, depending on the people we are working with, includes medical monitoring and things of that nature.

Senator REID. But the epidemiological studies have been part of this?

Mr. VEST. Not per se. No.

Senator REID. The Air Force report, on page 5, notes problematic conditions and health risks associated with contact and exposure to composite dust in the air; is that right?

Mr. VEST. Correct.

Senator REID. So why have there been conditions where workers have worked without gloves, for example, where ventilation has been poor and where dust circulates?

Mr. VEST. I am not aware of those conditions with Air Force employees.

Senator REID. As far as you are concerned, then, in the areas they have worked in, the ventilation has been adequate?

Mr. VEST. As far as I am aware. Yes.

Senator REID. You heard the—

Mr. VEST. If I may, sir, the report you are referring to is the symposium report which—

Senator REID. That's right.

Mr. VEST [continuing]. Covers all of industry and government.

Senator REID. I understand.

Mr. VEST. So it would not be exactly correct to say it was an Air Force report, if I may.

Senator REID. Okay. Although it was a symposium—

Mr. VEST. We sponsored it.

Senator REID. I didn't know what else to call it. What would you call it?

Mr. VEST. We just call it the summary of that nationwide conference.

Senator REID. Okay. Did any of the hearing information that you had placed in this report indicate conditions existing either at Boeing or Lockheed where there was poor ventilation?

Mr. VEST. I believe there was. In the course of the conference there were a number of people, some of whom have testified here today, who discussed ventilation and there was extensive discussion of both the Boeing and Lockheed situations.

Senator REID. Throughout the report, there was evidence that concluded that composite materials had been studied for toxic effects and, in general, are not considered high-risk materials. How was this conclusion reached?

Mr. VEST. That was reached by the panel members in the various panels.

Senator REID. Do you—

Mr. VEST. Their conclusions.

Senator REID. Which medical studies did you use to arrive at this conclusion? When I say "you" I am referring to the report.

Mr. VEST. I'll have to query the panel members and we can provide those to you. I don't have those.

Senator REID. When you are answering that, also keep in mind that I believe it is true—and I'm asking this in the form of a question—that there are also studies that indicate that epoxy resins may cause genetic damage, that the solvents used with composites can aid memory loss, that even low-level long-term exposure to solvents has been shown, in some medical studies, to cause adverse health effects. Are you aware that is also the case?

Mr. VEST. No, I was not aware of that.

[The additional information referred to follows:]

QUESTION. Which medical studies did you use to arrive at this conclusion? When I say "you" I am referring to the report.

When you are answering that, also take in mind that I believe it is true—and I'm asking this in the form of a question—that there are also studies that indicate that epoxy resins may cause genetic damage, that the solvents used with composites can aid memory loss, that even low-level long-term exposure to solvents has been shown, in some medical studies to cause adverse health effects. Are you aware that is the case?

Mr. VEST. In the course of their education and work spanning many years, the panel members have reviewed thousands of articles on potentially hazardous materials. These reviews included the materials of advanced composites systems and associated solvents. Each article was interpreted based upon experience and professional judgment. Based upon their knowledge and experience, the panel arrived at the conclusion at our conference that advanced composite materials represent low to moderate health risks which can be readily controlled using good industrial hygiene practices.

In contrast, high risk materials include known human carcinogens such as asbestos, other highly toxic materials such as chemical warfare agents, and highly infectious materials such as the acquired immune deficiency syndrome (AIDS) or hepatitis viruses. Use of these high risk materials requires extremely elaborate controls, precautions, and personal protective equipment.

While some of the chemicals used in advanced composite systems have demonstrated genetic change in laboratory experiments, only one, methylene dianiline (MDA), is listed by the American Conference of Governmental Industrial Hygienists (ACGIH) as a suspect human carcinogen. Epichlorohydrin, a precursor to epoxy resins, has been suggested as a suspect human carcinogen. By comparison, studies have indicated that over 100,000 naturally occurring chemicals, including many in foodstuffs, may also cause genetic changes under laboratory conditions.

Solvents are not unique to the composites industry but are a problem throughout the manufacturing community. It has been known for over 200 years that solvents affect the central nervous system and certainly can affect mental status when exposures are not adequately controlled. Again, proper industrial hygiene practices minimize the risk from these compounds.

Although we must always be aware of the possibility of synergistic effects in complex mixtures, the preponderance of evidence to date indicates such synergistic effects are rare. The Occupational Safety and Health Administration, for example, computes complex mixture exposures assuming additive effects. The most significant of the known synergistic effects is the effect realized with smoking and substances such as asbestos and radon.

Senator REID. And you have heard testimony here today, even from Boeing, that said they really don't know if these composite materials are safe—there isn't enough information. At least that is the way I understood the testimony.

Mr. VEST. We would agree that there is a great deal more information needed.

Senator REID. Does this report acknowledge that there are data gaps in the synergistic effects of the chemical mixtures?

Mr. VEST. It does.

Senator REID. Then how can you say that these aren't high-risk materials if you don't know this, for example?

Mr. VEST. In my testimony I have indicated that a quality occupational safety and health program, to include proper engineering controls and personal protective equipment, will, to the best of our knowledge, allow you to work with anything that we are aware of right now. And, in fact, in the Air Force, in the absence of the kind of knowledge that we would very much like to have, simply overprotects, if you can accept those words, or overdo it in terms of engineering controls.

Senator REID. The last question I have: in this symposium report, Doctor Patricia Sparks is listed as an independent consultant. You know she is not an independent consultant, is she?

Mr. VEST. I believe she represented herself that way.

Senator REID. It is my understanding that she has worked for Boeing's self-insurance program to assess workers' medical claims.

Senator Lieberman, I appreciate your returning after having presided over the Senate.

Senator LIEBERMAN. Thank you, Mr. Chairman. I regret I had to leave to assume one of those honors associated with being a freshman Member of the United States Senate.

I wanted to return just to tell you how much I appreciate this hearing and how much I want to hang in there with you in pursuit of this topic.

If I may, I would like to ask Mr. Carey a few questions.

I gather that the people from Boeing indicated repeatedly that they felt that their operation had fully met OSHA requirements. I also gather that you have been involved in an extensive investigation of the situation at Lockheed. I am not clear whether there has

been a similar investigation at Boeing or whether one is contemplated. Is there?

Mr. CAREY. Boeing is in the State of Washington, which has responsibility for its own federally-approved occupational safety and health program. So it is the State of Washington that is authorized to conduct those investigations. They have conducted numerous investigations at Boeing, but federal OSHA has no responsibility for conducting those type of investigations in the State of Washington.

Senator LIEBERMAN. So you just indicated, though, that to your knowledge the State officials have conducted regular investigations at Boeing?

Mr. CAREY. Yes, sir.

Senator LIEBERMAN. And, to your knowledge, have they found violations? Or has Boeing, as I gather the people from Boeing indicated today, been in compliance with OSHA?

Mr. CAREY. I don't know that I can say with certainty in every single case that there has been no violation, but I am aware that there has been numerous sampling done of the airborne contaminants and that, in many, many cases, they were found to be well within the Washington State or OSHA standards. There may be instances of violations or citations issued that I am not familiar with, but I do know that there were a number of issues that were found to be in compliance.

Senator LIEBERMAN. Great.

That leads me to this question: is it possible that the operations at Boeing might well have been in compliance with OSHA and still have subjected the workers to dangers in the work place?

Mr. CAREY. Yes, sir.

Senator LIEBERMAN. Which is to say that it is possible that the OSHA standards don't cover the whole array—let me put it another way. The OSHA standards don't necessarily protect workers from a whole array of work place injuries that might occur, for instance, from inhalation or handling of hazardous, toxic material?

Mr. CAREY. Yes, sir. I think you have heard testimony today that talks about compounding factors or environmental factors that would compound exposure or contact with some of these chemicals and that the OSHA standards do not take into consideration.

Senator LIEBERMAN. On a similar note, are OSHA inspectors trained to look for incidents in the work place that may have long-term negative health consequences, or are they mostly focused on what I would call "safety questions"?

Mr. CAREY. Our inspection staff comes from two general backgrounds. One is a safety side that looks primarily at traumatic-type injuries, but we also have a staff of industrial hygienists that are trained to look at the long-term chronic effects of exposure to the chemicals.

Senator LIEBERMAN. So that a typical OSHA inspector would be sensitized to that kind of inquiry as he went around?

Mr. CAREY. The typical OSHA health inspector—that's their job to be sensitized to that kind of problem, long-term problems. We also have the safety inspectors that, again, look at the traumatic. We usually distinguish between our safety inspections and our health inspections because we target those inspections from different data sources.

In the case of Lockheed we had both industrial hygienists and safety specialists as part of that investigation.

Senator LIEBERMAN. How would you make the judgment as to whether to send out a health inspector or a safety inspector to a site?

Mr. CAREY. That depends on why we went there. If we went there because we had knowledge of a specific hazard as a result of a complaint or media referral, we would evaluate what that complaint was about or what that referral contained, make a judgment whether or not it was a health hazard or a safety hazard and, again, assign our folks according to that.

When we do a program med safety inspection, those inspections are targeted in the manufacturing area based on the lost work day injury rate for that industry—lost work-day incident rate.

On the health side, when we do a program med inspection in manufacturing it is based on the prior OSHA history of health violations.

Senator LIEBERMAN. So in one instance you would send out a health inspector if the complaint suggested the presence of a health problem?

Mr. CAREY. Yes, sir.

Senator LIEBERMAN. And in the programmed inspections you would send out a health inspector if the previous history of complaints suggested possible health problems on the site?

Mr. CAREY. Previous history of OSHA findings. Yes, sir.

Senator LIEBERMAN. Let me just ask you one final question. Your testimony today—and I read some of it over the weekend—suggests that even what I would consider to be very well-organized sophisticated companies like Boeing or Lockheed have had these problems, or at least allegations and some evidence that we have seen from workers that had problems. From your vantage point, do you suspect that other smaller companies dealing in similar chemicals have similar problems?

Mr. CAREY. Well, we conduct over 60,000 inspections a year and issue citations for a variety of safety and health conditions. Violations of the hazard communication standard are the most frequently-issued citations.

Senator LIEBERMAN. Which is basically a failure to notify?

Mr. CAREY. It is more than that, Senator. The thrust of the standard is to educate, not just warn. To educate the worker, to educate the employer if the employer is ignorant of the facts of the chemical. So it is not just a warning that it is toxic. It really goes more to, and the thrust of it is, to train the worker in what the material is, what the effects of the material are so that they can respond at the earliest possible time when those effects may manifest themselves, to train the worker in how to properly handle the material so that it doesn't present the hazard. It may be toxic, but handles properly it may not be hazardous.

So the focus of the hazard communication standard is not just a warning and it is not just a labeling standard, it is really a training standard to allow all the people in the work place to participate in assuring safe and healthful working conditions.

Senator LIEBERMAN. So I am concluding that the failure to uphold that standard is the most commonly found violation?

Mr. CAREY. That is correct.

Senator LIEBERMAN. That is a common problem, in that sense, throughout the country?

Mr. CAREY. I think—and I can supply the exact data for the record—that it is about 35 percent of the manufacturing facilities, which were the facilities covered in the data that we have. About 35 percent of the manufacturing facilities that we have conducted inspections on have had violations of the hazard communication standard.

Senator LIEBERMAN. Thank you, Mr. Carey.

Thank you, Mr. Chairman.

Senator REID. Mr. Vest, without getting into sensitive information, are there any new and unique chemicals being used in the production of Air Force aircraft at either Lockheed or Boeing facilities?

Mr. VEST. I have asked that question repeatedly of our program people, as well as the people in the companies involved, and the answer I have been given consistently is that there are not.

If I may offer one footnote to the questioning of just a moment ago?

Senator REID. Sure.

Mr. VEST. We, as users of chemicals, often have our most difficulty with getting all of the information we need from the folks that make the chemicals. I think that this is one of the important points that certainly came out in our conference which everybody seemed to agree with. We simply have to make a much, much better, concerted effort to ensure that, as we acquire chemicals and they get put into things, that, indeed, the information that is necessary for hazard communication follows those chemicals throughout their entire life cycle.

Senator REID. That is what Mr. Elkins is going to work with the committee to see if we can improve that.

Does the Air Force permit or deny access to regulatory officials to classified programs?

Mr. VEST. We grant access. This was one of the problems for a time in the Lockheed program, in part because of the change-over from the state program to the federal program and back now to the state program.

There was a period of time where no OSHA people in Region 9 were cleared for access into parts of the Lockheed plant. As soon as we found that there was a problem, I took the action. I believe that it was taken care of in 24 hours.

What we have done with OSHA—and I have personally visited with all the regional administrators or their representatives—is to suggest that there be an adequate number of people with security clearances throughout the nation so that as these programs need to be accessed we can do that. But there has to be a basic security clearance.

Senator REID. Is there anything in government security regulations which would apply to government contractors who would inhibit a worker from fully disclosing relevant information to a personal physician in terms of describing what materials the worker handled or what functions that person performed?

Mr. VEST. Perhaps I'd have to rephrase the question a little bit, if I may, to answer it appropriately and honestly. It was suggested in the Lockheed situation—or it may have been fact—that some people were not able to get information about what they were working with. We looked into that in some detail and found that there is no reason whatsoever why people who worked with these things, even in that program, could not have—

Senator REID. So if it happened, it shouldn't have.

Mr. VEST. No, sir, it should not. There was just no reason why that should happen.

Senator REID. Are government contractor employees required to sign any kind of security pledge? And, if so, what does the pledge entail?

Mr. VEST. It depends on if you are working on one of the special access programs, either if you are government or in industry, you would sign a statement concerning safeguarding the information.

Senator REID. Senator Lieberman, do you have anything further.

Senator LIEBERMAN. No, I don't. Thank you.

Senator REID. I want to say that I appreciate all of the testimony we received here today. Some of it has been very personal in nature and we understand that, and we certainly didn't ask the questions in any manner to embarrass anyone. This is a fact-finding body. We are attempting to, as I indicated in my opening statement, get to the bottom of what all this is about.

Certainly this one hearing will not get to the bottom of all this, but at least we have made a stride or two forward so that we, as a Congress, can better handle the obligations we have to people so that they are not afraid of having their children eat apples or whatever the case might be.

The testimony we have heard here today raises a number of questions in my mind that we, as a government, must do more to give the people that work in government the tools with which to provide information for these 65,000 chemicals that are floating around out here some place so that people do feel safer in the work place, so that there is more information available in the work place, not only with individual chemicals, but we have to also determine what happens when these 65,000 chemicals are mixed one with another.

It is one thing to say this chemical doesn't, in and of itself, provide any adverse effects to someone, but you mix it with Compound-W and it will kill you. We need to know that, and we certainly don't have the tools at our disposal now to do that.

So this committee is going to be heavily engaged in trying to alleviate the fears that we have in the work place and the public, in general.

So I, along with the rest of the committee, express my appreciation to everyone for having been here today and offering this outstanding testimony.

The record will stand open for ten days for anyone to submit any additional evidence that they feel is appropriate.

This committee stands in adjournment.

[Whereupon, at 1:50 p.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

[Statements submitted for the record follow:]

CHEMICALLY INJURED UNITED COALITION
POST OFFICE BOX 26054
ENCINO, CALIFORNIA 91426
(818) 906-CIUC

March 11, 1989

U.S. Senate Environment and Public Works
Subcommittee on Toxic Substances,
Environmental Oversight and Research and Development
in Aerospace
Chairperson, Senator Harry Reid

The following I would ask to be included in the Senate Subcommittee's records, hearings held March 6, 1989 as per Senate Hearing Regulations.

Dear Senator Reid and Subcommittee Members:

My name is Beth Gausman and I have been chemically poisoned. I want the subcommittee to know that I don't work in the aerospace industry nor do I work with any other chemicals. I happened to be just passing by and standing by a common carrier. What was the common carrier? You may be shocked to hear the name, United Parcel Service. Yes, that's right. I said United Parcel Service. In 1985, I was exposed to a toxic substance which became a gas while I merely stood by a United Parcel Van just as a bystander. Unusual, I thought perhaps. Then I later found out that this is a common everyday occurrence. The Department of Transportation publishes a book of hazardous materials. It happens to be 2-1/2 inches thick. Almost every chemical used in industry, every chemical known to man is in that manual.

Gentlemen, nearly 90% of those chemicals are allowed to be carried on parcel vans. United Parcel Service carries cases of pesticides, lethal chemicals, toxic liquids and gases of every manner and sort. I have evidence that the same toxic lethal chemicals that cause toxic clouds are carried on United Parcel Vans. United Parcel is allowed and does carry these chemicals on a regular basis throughout our country. Senator Reid has stated that he became painfully aware of the dangers of chemicals through the Henderson tragedy in his home state of Nevada. Now Senator Reid is chairing this subcommittee on the hazards of toxic substances and chemicals in the aerospace industry. In life, often one discovery will lead you to another. This was the case in California in 1986. Hearings were held to discuss the problem of carrying rocket fuel on our heavily traveled freeways and highways.

At these hearings, expert testimony revealed a new discovery. That was in addition to rocket fuel, some of the most highly toxic chemicals were being transported in trucks on these highways. These substances were labeled "inhalants". These chemicals are so volatile that they become toxic clouds and can indeed wipe out entire cities if an accident is to occur, 190 "inhalants" were identified. The discovery of these inhalants and their potential lethal hazard sparked legislation in California. Assembly Bill AB2705 was born. I worked very hard to make this legislation a reality. AB2705 did pass California State Legislature and was signed by the governor at the end of last year and because of it California's highways are safer. But the fact remains that these same inhalants are carried up and down all our highways everyday and many of them are carried on United Parcel vans.

On October 25 the Los Angeles County Board of Supervisors has passed a motion for stricter regulations of parcel van transport of toxics.

Gentlemen, I was not warned that an everyday, common carrier, parcel van would be carrying such a highly volatile substance. I was not warned that by merely standing by, standing alongside of a parcel van in the city street my health and my life would be changed in one morning. I was rushed by ambulance to emergency where I was given a chemical shower, administered oxygen, was on a liquid diet for almost two weeks and then after that I had pureed food for a period of six weeks. I had pleurisy the first year four times. I had extreme pain. I had coughing, loss of voice and yet, I was not told that there would be any long term effects from chemical exposure. I was told how lucky I was that it wasn't worse because of how dangerous these substances were. I now have joint pain every single day. I wrap my knees every day. My joints almost don't hold me now. I have chiropractic treatment three times a week, I take seven medications daily, I have oxygen in my home and recently when I was in Washington, D.C. to testify at the Senate hearings I had to be hospitalized emergency and given a breath treatment to get me through the day. I have hypersensitivities so badly that I can only wear cotton, silk and I can still wear some acrylic. I cannot wear new clothing and I cannot go into a newly decorated room. Paint fumes bother me. Everyday household chemicals I cannot use. I cannot read a newspaper because newsprint bothers me. I get headaches reading, I itch, I cough, I sneeze when around most chemicals. I am housebound in the smog. During the hot hours of the day, I am literally non-functional. I sleep four to five hours during the middle of the day. I am tired, I am exhausted, depressed. I have suicidal tendencies. I go into rages. I was also exposed to plastic and the packaging as the chemical ate through its packaging. Now I have abnormalities in my blood.

I had to install a 2nd window of double glazed glass, special air filters and household materials to protect me from pollutants. We are the Bubble people made sensitized to the outside world. This is our fate, made that way through chemical injury.

All of this can be documented and is a result of the chemical exposure. I know of people who have been exposed to toxic chemicals, one of whom was exposed at McDonnell Douglas plant. He now is so hypersensitive to plastics that he cannot live in a normal environment. He has isolated himself. He now lives in a remote area and he is building a home lined in foil because even the fumes from the drywall make him sick. The medical evidence is building and we do know that this is a factor in the immune breakdown. These chemicals cause immune function breakdown and the individual as in my case becomes more and more sensitive to everyday household chemicals and substances and chemicals that are a part of our lives. Many people who have this hypersensitivity are ostracized, told that it is all in their heads, that it is psychological in nature. The evidence is clear that these chemicals cause neurological problems, organic brain syndrome, memory loss, and these are not psychological problems, rather, they are neurological problems.

Many chemically injured individuals have an extremely difficult time obtaining Social Security benefits. It has only been within the last year that chemical injury and hypersensitivity has even been given a number.

Gentlemen, this illness is as real as if I were to take a knife and cut off your arm. These injuries are real. Many of us would give our arm to get our health back.

Transportation of toxics can be made safer. Assembly Bill AB2705 is now law in California and it is a good law. It sets up specialized routes for transportation of toxics. The vehicles carrying the trucks are equipped with inhalation equipment and are monitored by the fire department and the police department. Safe stops and safe parking has been set along the routes. Parcel vans carrying toxics in our residential neighborhoods and our business districts should not be tolerated any longer. I'd also like to point out to the members of the subcommittee that parcel vans are also allowed to carry food. They carry food in conjunction with these toxics in these vans. As a matter of fact, in my injury, a cleanup crew came out and sprayed down the interior of the truck and its packages. I have enclosed a photo of the incident with the hazardous materials team behind the United Parcel van. I have every indication and evidence that these packages were delivered with no investigation as to whether they were food or not. Also, it is well known that most of these chemicals will penetrate cardboard, the outer material of all these packages. When there is a toxic spill a cleanup company comes out to clean up the spill and is hired by the perpetrator, the spiller. This is a direct conflict of interest and we believe that this should never occur. The poor victim as in my case is at the mercy of the spiller. A major toxic spill, a hazardous materials van is sent out to investigate, in all of Los Angeles County, over three million people, there are two hazardous materials vans. In California in 1988 there were approximately 1400 toxic spills and incidents, how many were reported properly? How many had the

evidence saved? How many people were told of the long term effects of toxics? Medical evidence supports the fact that immune breakdown occurs after toxic exposure. It can occur in a matter of months or a matter of years. I now have joint pain that may last me the rest of my life. My life has changed. The quality of my life has been changed.

I urge this committee to advise the U.S. Department of Transportation to use AB2705 as model legislation and to further limit parcel van toxic transportation to these designated routes. This will make our streets and highways safer and prevent further toxic exposure of our unsuspecting citizens.

I have founded a group, a group of victims across the United States, victims of chemical exposure. Exposures at work and in the environment. Chemically injured victims typically do not receive adequate medical care or legal counsel. The CIUC has evidence that as many as 10's of 1000's of people suffer from exposure and must live in isolation. I have video tapes and other information regarding the horrible hypersensitivities caused by this chemical exposure.

This may be the most important learnings of the century. We have turned the corner to the chemical age. We are now seeing the ensuing results.

Just as therapy and prosthetics are part of settlements, special safe housing should be a part of any settlement damages.

Who better to warn the workers and the public than the victim himself! The victim will tell you about long term effects... how he suffers daily, how his health has been stolen, how his mind and clear thinking slowly fade.

It is my opinion that people have been exposed to chemicals-- the chemically injured do not currently have fair and adequate medical and legal representation, adequate workers compensation rights, or adequate Social Security rights. Many of the chemically injured end up penniless and homeless. We are a viable group of people who have been injured. We have special needs and we intend to communicate these needs to our legislators, to our labor unions and to the public until we achieve our rights.

Further, the Chemically Injured United Coalition has presented 15 recommendations to be used as a guideline for aerospace worker safety to prevent further unnecessary chemical exposure to aerospace workers.

We are the Bubble People. We won't go away. Our numbers will only grow. We need to live in a safe place. Will the government understand or protect us?

Thank you.

Beth Caesman
CIUC President

CHEMICALLY INJURED UNITED COALITION
POST OFFICE BOX 26054
ENCINO, CALIFORNIA 91426
(818) 906-CIUC

March 11, 1989

U.S. Senate Environment and Public Works
Subcommittee on Toxic Substances,
Environmental Oversight and Research and Development
in Aerospace
Chairperson, Senator Harry Reid

Mr. Chairman and Members of the Subcommittee:

As founder and president of the Chemically Injured United Coalition, the National Victims Coalition for the Chemically Injured, I feel it my responsibility to comment on the testimony here today, March 6, 1989.

The Victims' Panel reported their own exposures and the resulting long term health effects. Both Boeing and Lockheed victims reported gross safety violations occurring on a regular basis. Workers at both plants reported real threats of "downgrading" and firing when they complained of safety violations. Time would not allow a complete picture of the horrible suffering these people have endured, but the symptoms mentioned include: memory loss, severe swelling in hands, severe swelling and pain in joints, excruciating headaches, severe depression and suicidal thoughts, respiratory problems, skin ulceration, stomach disorders, dermatitis to raw and bleeding skin.

Aerospace Victims spoke of poor ventilation and witnessing employees complaining of "becoming ill" in the bathrooms.

One victim witness stated that where air monitoring was done, she witnessed all the fans in the department were brought to the monitoring area! Lori Liberty was wearing gloves and dark glasses when she stated she needed to protect her hands and eyes. Faye Schrum had difficulty remembering her statements throughout her testimony.

The medical panel presented this complicated technical and sophisticated information in a factual manner backed up by hard medical research and case histories. Technical information was presented in a factual manner. It was also backed up by case histories. The CIUC understands that this information is on the forefront, the cutting edge of research in this area of chemical exposure. As the panel testified, the general medical profession knows little to nothing regarding the long term health effects of chemical exposure.

At this time, I would like to make a comment, the CIUC would like to comment regarding the aerospace industries summary. I am referring here to Occupational Health Aspects of Advanced Composite Technology in Aerospace Industry. A conference that was held on February 6 through 9, 1989 in Fairborn, Ohio. It is the CIUC's view that this was indeed not a independent conference, but rather an industry conference. It was attended by 270 representatives from the Department of Defense, Service Components, Industry, and other federal agencies. As you will notice, no victims were invited. It is our clear view that this indeed was not an independent conference and the summary and results of this conference can only be considered to represent industry's viewpoint in the health hazards of chemical exposure in the aerospace industry.

The CIUC would like to comment on industry spokesmen's testimony Dale Daniels and Joseph Peritore. Dale Daniels, vice-president of Lockheed compared these toxic exposures and long term suffering of Lockheed employees to a boating excursion. He continued to belittle and discount the victims' suffering in a folksy manner. Referring on two occasions to utilizing good, old horse sense. An accurate statistical comparison could not even have been made to a kayak in a hurricane. These employee chemical victims merely showed up for work. In reference to the safety of the chemicals being used in aerospace, Mr. Daniels made a similar quote four times. "I tell them (referring to his managers) if an employee comes to you and tells you it is not safe, don't use it. If you're not sure it's safe, don't use it." Mr. Daniels repeated this statement despite the victims' previous testimony that they were threatened with being fired when they complained about the safety violations. During Mr. Daniels' testimony, Lori Liberty, a chemical victim poisoned at Lockheed was seated two rows away. She was so angry she could barely contain herself. All of the chemically exposed victims found Mr. Daniels' attitude in his testimony to be highly offensive.

Joseph Peritore spoke on behalf of Boeing. The inferences made to the psychological aspects of anxiety and depression were found not only by the CIUC, but were objected to by the chairman of the subcommittee, Senator Harry Reid. The CIUC is a national coalition of the chemically injured. It has been reported to the coalition on many occasions that this is one of the prime defenses against the poor chemical victim who in many instances fights multimillion dollar corporations and their defense attorneys. There is hard medical fact that chemical injury causes neurological deficit and changes and thus causes behavioral changes. These can be exhibited in anxiety and depression. They are not psychological in nature. Workers exposed at both the Boeing and Lockheed plants totalling over 500 suffer physical symptoms from their exposures. There is evidence that workers have died from exposures to these chemicals. Many workers have developed cancer. It is ludicrous for industry to take a position to discount and dismiss the suffering of these poor workers to something thought up in their heads.

Mr. Peritore stated Boeing was within the OSHA's standards for monitoring the chemical in the plant. I would like to point out that the victims' testimony states that when OSHA monitored the chemicals within the plant, fans were brought in to add ventilation and the doors were opened when monitoring occurred.

Finally, OSHA testimony, during this testimony, it was stated by one of the members of the OSHA panel that OSHA's monitoring equipment was not sophisticated enough to test adequately the synergistic effects of these new composites and other chemicals present in aerospace plants. Lori Liberty, chemical victim, poisoned at Lockheed, stated in her testimony that when the Pentagon got involved at the Lockheed plant, Lockheed was given 6 weeks prior notification to test the Lockheed facility.

It is the CIUC's understanding that OSHA regularly gives prior notice to industry for inspection and when a violation is determined by OSHA, a fine is not automatically administered. Lori Liberty was complaining about Lockheed safety equipment violations for nearly two years. She also complained that material data safety sheets were not posted.

In OSHA's written testimony, page 8, OSHA states that Lockheed Burbank 2000 employee hours or 250 work days were utilized to inspect the Lockheed plant. I would like to point out that Lori Liberty worked with chemicals at a Lockheed plant for 9 years. Faye Schrum and others at Boeing and Lockheed (employees) worked for years with these chemicals. Many, many thousands of work hours were put in exposed to chemicals. OSHA estimates that at least 32 million employees in every type of industry are exposed to chemicals at work. Chemicals range from headaches to cancer. These statistics regarding the health effects are compiled by the established medical profession. The CIUC wonders how many of these people exposed, if scrutinized by Dr. Broten's techniques of research might have long term effects from chemical exposure. Currently we have information that there are 65 thousand chemicals and this number is growing, yet there are only standards developed for 600 individual chemicals have MDS sheets compiled on them by OSHA.

The CIUC is a coalition of groups and individuals of people who have been injured by chemicals. This subcommittee is an important first step into the study of the long term devastating effects caused from chemical exposure. The CIUC would like to commend the subcommittee for this all important hearing.

Thank you.

Beth Caspary
C.I.U.C. President

CHEMICALLY INJURED UNITED COALITION
POST OFFICE BOX 26054
ENCINO, CALIFORNIA 91426
(818) 906-CIUC

MY NAME IS LORI LIBERTY. I WOULD LIKE TO THANK THE
COMMITTEE FOR GIVING ME THE OPPORTUNITY TO SPEAK HERE
TODAY. BECAUSE I COMPLAINED SO LONG AND HARD TO MANAGE-
MENT AND I WASN'T PAID ANY ATTENTION.

I'M EMPLOYED AT LOCKHEED BURBANK FOR THE LAST 9 YEARS,
1979 TO PRESENT. I HAVE BEEN POISONED BY CHEMICALS AT
WORK! I'D LIKE TO TELL YOU MY EXPERIENCE.

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POST OFFICE BOX 26054
ENCINO, CALIFORNIA 91426
(818) 906-CIUC

1. CHEMICALS -

SOME OF THE CHEMICALS I USED AS PART OF MY JOB INCLUDED MEK AND MIBK SOLVENTS, SEALANTS IDENTIFIED AS AVCOAT OR LCM-40-2121 (LOCKHEED PART NUMBER). ALSO PERCHLORACTHYLENE, MSC-1 & MSC-3.

2. STORAGE -

THESE MATERIALS (AND OTHERS) WERE STORED IN (LARGE) DRUMS OFTEN LEFT OPEN, OR IMPROPERLY SEALED, CONTENTS LEAKING ONTO FLOOR.

3. SMALL CONTAINERS -

CONTAINERS THEMSELVES NOT LABELED
CLOTH RAGS SUPPLIED BY LOCKHEED FOR WORKERS AND WORK STATION CLEAN-UP WERE ALLOWED TO ACCUMULATE, WHICH ALLOWED THE CHEMICAL FUMES TO FURTHER PERMEATE AIR.

SUPERVISORS UNWRITTEN POLICY WAS TO PUNISH COMPLAINING WORKERS - ONES WHO COMPLAINED ABOUT SAFETY VIOLATION OR WHY CONDITIONS.

BUT UNLESS A WORKER COMPLAINED, THEY WEREN'T GIVEN ACCESS TO COMPANY - SUPPLIED SAFETY EQUIPMENT OR CLOTHING.

SUPERVISOR LEON FITZGERALD - WHEN A REQUEST WAS MADE TO PROPER AND PROPERLY - FITTING SAFETY EQUIPMENT - TOLD MS. LIBERTY SHE WOULD HAVE TO USE WHATEVER HE GAVE HER OR GO HOME WITHOUT PAY.

4. SAFETY EQUIPMENT -

AVAILABLE, BUT NOT MANDATORY INCLUDED ITEMS SUCH AS:
SMOCKS, RESPIRATORS, PARTIAL FACE-MASKS.

ALL OF WHICH WERE IMPROPERLY FITTED AND DID NOT AFFORD ANY MEASURE OF SAFETY.

5. VENTILATION -

ODOR OF VARIOUS CHEMICALS SATURATED THE AIR, BECOMING WORSE WHEN TEMPERATURES WOULD OFTEN REACH 130°

UNION REGULATIONS - THAT STATE IF ROOM TEMPERATURE REACHES A CERTAIN LEVEL, WORKERS SENT HOME WITHOUT PAY -
(WHICH OCCURRED FREQUENTLY IN SUMMER MONTHS)

NO AIR-CONDITIONING, SMALL FANS USED ONCE IN A WHILE.

6. GUIENEA PIG -

MS. LIBERTY, WAS TOLD TO SUBMIT (SHE FEELS THIS BECAUSE OF HER NUMEROUS COMPLAINTS) TO A TEST - LASTING OVER 5 HOURS - WHICH CONSISTED OF HER WEARING MONITORING EQUIPMENT - STRAPPED TO HER BODY - IN ORDER TO EVALUATE CHEMICAL EXPOSURE -

THIS WAS INITIATED BY LEON FITZGERALD AND WITNESSED BY UNION REPRESENTATIVE JOHN CARPENTER.

SHE HAD NO IDEA WHAT THE UNLABELED UNIDENTIFIED MATERIALS WERE - SHE WAS TOLD THEY WERE "NEW" CHEMICALS AND SHE WAS TO TEST THEM.

7. TODAY'S HEALTH -

I HURT FROM HEAD TO TOE - I CAN NO LONGER WORK, I AM DISABLED.

- 1) HEADACHES - SEVERE, CONSTANT TAKE DEMERAL INJECTIONS TO ALLEVIATE PAIN AS WELL AS DAILY MEDICATION.
- 2) EYES - FORCED TO WEAR DARK GLASSES ALMOST CONTINUOUSLY BRIGHT LIGHTS CAUSE PAIN. CONSTANT "PULLING" SENSATION.
- 3) MEMORY - LOSS AND CONFUSION.
- 4) SLEEP - DISRUPTED 16-18 HOURS DAILY
- 5) EMOTIONS - ON A ROLLER COASTER, RAGE, DEPRESSION, WEeping.
- 6) SPEECH - AFFECTED BY SLURRING, POOR WORD RETRIEVAL, INABILITY TO EXPRESS SELF - DUE TO CHEMICALLY INDUCED SEIZURE.
- 7) SKIN - RED WELTS, DISFIGURING RASHES, WHITE SPOTS, ITCHING AND DISCOMFORT.
- 8) FACE - DISFIGURING BLOTCHES (CHEMICALS SPLASED INTO FACE)

- 9) HANDS - FORCED TO WEAR LAYERS OF PROTECTIVE GLOVES TO PREVENT CONTACT WITH ANY OTHER CHEMICALS.

CORTISONE SHOTS GIVEN AT TIMES - TWICE A WEEK IN AN EFFORT TO SEEK RELIEF FROM PAIN AND BLEEDING.
- 10) MEDICATIONS - TAKES 12-14 DIFFERENT TYPES OF SHOTS FOR TREATMENT OF SKIN AND HANDS.

PAIN MEDICATIONS

UP TO 20 PILLS PER DAY BECAUSE OF INCREASED TOLERANCE TO MEDICATION - NO END IN SIGHT.

I DON'T WANT ANYONE TO GO THRU THIS HELL. ALL I DID WAS MY JOB. I KEEP GETTING SICKER AND I'M AFFRAID I MIGHT HAVE A DEFORMED BABY. I'M AFFRAID I'LL GET SICKER AND GET CANCER.

THE SYMPTOMS DESCRIBED DO NOT INCLUDE ALL EXPERIENCED SO FAR, NOR THOSE CONTINUING DAILY.

MS. LIBERTY WAS UNABLE TO WRITE THIS STATEMENT ON HER OWN DUE TO HER SPEECH, CO-ORDINATION AND MEMORY DYSFUNCTION.

CHEMICALLY INJURED UNITED COALITION
POST OFFICE BOX 26054
ENCINO, CALIFORNIA 91426
(818) 906-CIUC

March 11, 1989

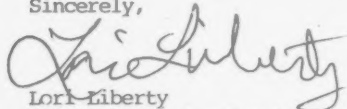
U.S. Senate Environment and Public Works
Subcommittee on Toxic Substances,
Environmental Oversight and Research and Development
in Aerospace
Chairperson; Senator Harry Reid

Mr. Chairman and Members of the Subcommittee:

My name is Lori Liberty and I want to thank the members of the subcommittee for holding these hearings. I gave the best testimony that I could and I was very happy to get an opportunity to do so. I needed help going over my testimony because I have such terrible memory problems. I tried to remember as best I could. It took me many, many hours. I was very upset with the testimony of Mr. Daniels, I am hurting. I cannot work. My whole life has been changed and he compares my injury to a boating trip. I complained for nearly two years that the safety equipment was not fitting properly. I have health problems that will last for the rest of my life and I was very, very upset that he said, "If the material is not safe, you're not sure it's safe, then the employees are not to use it." This was certainly not the case at Lockheed.

Over two years ago when I was complaining of the problems at Lockheed, I was pretty much alone that I knew of. Then later, class action lawsuit was filed against Lockheed. I believe that there must be other aerospace employees who have been hurt by chemicals and are going through some of the same things I went through trying to complain to their superiors. I no longer feel alone. I'm part of a national group, the Chemically Injured United Coalition. This has helped me in my struggle to live every day one day at a time, and I know it can help others. I want to tell my story so that other people who are out there who feel alone can get help. The people who have been chemically injured are uniting so that they no longer have to be alone. I could not go to the senate hearings without help of the Chemically Injured United Coalition. I hope these aerospace plants can be cleaned up so no one else will be hurt. I don't want anybody to suffer like I'm suffering.

Sincerely,



Lori Liberty
Chemically Injured United Coalition

LL:sd

CHEMICALLY INJURED UNITED COALITION
POST OFFICE BOX 26054
ENCINO, CALIFORNIA 91426
(818) 906-CIUC

UNITED STATES SENATE SUBCOMMITTEE ON TOXIC SUBSTANCES, ENVIRONMENTAL
OVERSIGHT, RESEARCH AND DEVELOPMENT ON THE USE AND EFFECTS OF
TOXIC SUBSTANCES IN THE AEROSPACE INDUSTRY:

CHEMICALLY-INJURED UNITED COALITION RECOMMENDS THE FOLLOWING
TYPES OF CHECKS AND BALANCES SYSTEM BE IMPLEMENTED INVOLVING
THE SAFETY AGENCIES, THE COMMUNITY AND THE EMPLOYEES:

1. THE MATERIAL DATA SHEETS BE MORE
DETAILED AND PRECISE AS TO THE
POSSIBLE HEALTH HAZARDS. IN SOME
INSTANCES, THE ONSET OF SYMPTOMS
MAY NOT APPEAR FOR 10 OR MORE YEARS!
A SHORTENED VERSION OF THIS M.D.S.
SHOULD BE POSTED AT THE WORK STATION
AND ON EQUIPMENT.
2. WEEKLY EMPLOYEE SAFETY MEETINGS
DISCUSSING CURRENT SAFETY PRACTICES.
3. WORK AREAS MUST BE WELL VENTILATED
TO PROVIDE THE WORKER THE LEAST
ACHIEVABLE EXPOSURE.
4. DAILY AMBIENT AIR SAMPLES MUST BE
TAKEN AT PEAK WORK HOURS AND RECORDED
FOR EMPLOYEES PURVIEW AND POSSIBLE
PUBLICATION IN LOCAL NEWSPAPER.

5. DAILY WATER SAMPLES MUST ALSO BE MONITORED AND RECORDED AND PUBLISHED.
6. AEROSPACE INDUSTRY SITES MUST DO A DAILY INSPECTION AND INVENTORY INCLUDING PHOTOS OF ALL STORED AND "WORKING" CHEMICALS. THIS INFORMATION MUST BE LOGGED AND DISPLAYED AT THE SITES' OFFICE FOR PUBLIC INSPECTION. AT THE END OF EACH MONTH, A "BALANCE SHEET" OF THOSE CHEMICALS PURCHASED, USED, STORED ("WORKING" OR IN CURRENT USE) WILL BE TALLIED. THIS MONTHLY TALLY SHEET WILL THEN BE SENT TO THE FIRE DEPARTMENT AND PUBLISHED IN THE LOCAL NEWSPAPER.
7. COMPARATIVE BLOOD LEVELS WHICH ARE UTILIZED TO DETERMINE ALLOWABLE "SAFE" AMOUNTS OF CHEMICAL EXPOSURE MUST BE REDUCED AND THE COMPARATIVE SAMPLE MUST BE TAKEN FROM OUTSIDE THE AEROSPACE INDUSTRY AND SURROUNDING COMMUNITY. OTHERWISE, THE SAMPLE BLOOD LEVELS WILL BE TOO HIGH FOR AN ACCURATE COMPARISON.
8. CAL OSHA AND FEDERAL OSHA MUST MAKE REGULAR NON-SCHEDULED INSPECTION VISITS. THIS IS OUR RECOMMENDATION EVEN THOUGH WE KNOW FULL WELL THAT

THERE ARE NOWHERE NEAR THE AMOUNT
OF INSPECTORS NEEDED TO INSPECT
ON A REGULAR TWO-WEEK BASIS.

9. SAFETY EQUIPMENT BE SUPPLIED TO
EACH AND EVERY WORKER. GLOVES
(NON-PERMIATING TYPE) AND RESPIRATORS
MUST BE DESIGNED FOR COMFORTABLE
WORK USE.
10. IF ADEQUATE, SAFE VENTILATION CANNOT
BE ACHIEVED, THEN FULL BODY SUITS
WITH ATTACHED AIR SUPPLY AND MASK
MUST BE WORN! THE WORKER CANNOT
BE EXPECTED TO ENDANGER HIS HEALTH
AND THE QUALITY OF HIS LIFE FOR
THE EMPLOYER'S BENEFIT.
11. ALL INSPECTION IRREGULARITIES SHOULD
BE PUBLISHED IN THE LOCAL NEWSPAPERS.
VIOLATIONS WILL BE CITED AND FINED
UPON INSPECTION.
12. STORAGE OF CHEMICALS ON SITE FOR
THE AEROSPACE INDUSTRY MUST BE REDUCED
DRASTICALLY. SUPPLIES MUST BE KEPT
AT A MINIMUM FOR THE SAFETY OF THE
EMPLOYEES AND THE LOCAL COMMUNITIES.
13. THE AEROSPACE INDUSTRY MUST PUT
BACK A PORTION OF THEIR PROFITS

INTO THE DEVELOPMENT OF SAFER WORKING
TECHNIQUES USING THESE CURRENT CHEMICALS.

THE CIUC SUGGESTS A FIGURE OF 20%.

THIS SEEMS A FAIR PERCENTAGE SINCE
THE AVERAGE AEROSPACE WORKER PAYS
APPROXIMATELY 20% OF HIS PAYCHECK
IN TAXES, SOME OF WHICH HE IS PAYING
TO MAKE HIMSELF SICK!

14. THE CHEMICAL MANUFACTURERS MUST
SHARE THE RESPONSIBILITY FOR THE
LOSS OF HEALTH OF THESE WORKERS.
15. A PORTION OF THE CHEMICAL MANUFACTURERS
PROFIT MUST BE SPENT ON DEVELOPING
SAFER, LESS NOXIOUS CHEMICALS.
THIS PORTION SHOULD BE AS HIGH AS
35% SINCE ALL THEIR PROFIT COMES
FROM THE SALE OF THESE CHEMICALS.
RECORDS SHOULD BE KEPT OF THE AMOUNTS
OF CHEMICALS SOLD TO THE AEROSPACE
INDUSTRY BY THE CHEMICAL MANUFACTURERS
AND DISTRIBUTORS.

PERHAPS THIS MAY SEEM LIKE A CRUDE AND RUDIMENTARY LIST TO
THE EXPERTS. THE C.I.U.C. BELIEVES IT TO BE A VIABLE, WORKABLE
SYSTEM TO REDUCE CHEMICAL-INJURY TO THE AEROSPACE WORKER.

WRITTEN STATEMENT TO BE ENTERED INTO THE RECORD OF THE MARCH
6, 1989 MEETING OF THE UNITED STATES SENATE COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS, SUB-COMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT.

RESPECTFULLY SUBMITTED BY:

DEBORAH FORBES-SUTHERLAND

Every day the news media tells us of toxic chemical spills, explosions and accidents. We hear of neighborhoods complaining of toxic waste dumps located near their childrens' schoolyards. Communities across America have annual Household Toxic Waste Collection Days.

We hear of the cancer clusters among very young children. We hear of the agricultural workers who collapse in the fields sprayed with pesticides.

And now we are beginning to hear of facotry workers with strange illnesses, dying in increasing numbers because of the use of toxic chemicals used in the manufacture of the very products which make those jobs possible.

What are these toxic substances? They carry names like: Benzene, Methyl Ethyl Ketone, Formaldehyde, Toluene, Chlorinated Solvents, Epoxy Resins, Polyamides and Polyamines.

Substances, toxic chemicals, which go into the making of nearly every conceivable product our technology has created.

The refrigerator magnets you use in displaying your childs' artwork. A favorite pair of earrings worn on those special occasions. The desk where you have stacked all your important papers. The new carpeting and drapes ordered when you redecorated your home or office.

The tennis racket, the set of golf clubs, the skis you use to keep your body in shape. The new gym, school, office building down the street is built using these hazardous products.

That new car you've been dreaming of is largely made up of exotic new plastics. That last plane trip you took wouldn't have been possible if it weren't for all the poisonous chemicals used in its' manufacture.

Remember your tears of grief when we lost the Challenger? Your tears of joy when the Shuttle soared again? Our space program depends on the use of these substances.

As the land of the free, Americans have made a commitment to a strong defense. Without the technological wonder-chemicals we would have no tanks, no armament, no Stealth Bomber.

At what price do all these 'things' come? Sadly, we are paying the highest price of all - we exchange healthy, productive lives for plastic widgets and geegaws.

America a hundred years ago realized the importance of protecting American workers from the hazards of the workplace. Legislation was enacted to set up regulatory agencies charged with protecting workers. Workers Compensation Boards were established to provide an economic cushion for the displaced injured worker. We began to demand and get higher safety standards in every industry. American businesses responded by designing and building better and safer machinery, by conducting worker safety programs, by becoming aware that an injured or dead worker meant lost productivity, lost profits, and a weakened position in the world marketplace.

It's so much easier to recognize the dangers of the workplace when injuries are shocking and gruesome. Miners crushed and suffocated to death in unsafe tunnels. Fingers, hands, arms lost to press machines. Construction workers falling to their deaths from inadequate scaffolding. Refinery workers suffering disfiguring burns or agonizing deaths from oil fires.

But America was aware of other workplace dangers. Not as dramatic, nor as sudden as the deaths and mutilations just mentioned. But the more insidious injuries. Coal dust settling in a miners' lungs, slowly strangling the life force within. Textile workers exposed to cotton dust particles that cut short many a young mothers' life. Asbestos stealing the lives away of men and women who built our nations' homes, schools and factories.

Children unable to breathe because of the asbestos contaminated air in their schoolrooms. Uranium miners and nuclear energy plant workers cut down in their prime, losing their ability to produce future generations because they were exposed to the silent thief of radiation poisoning.

Each time America has heeded the cry of her people when they have asked for help. We have met each crisis head-on. America has cried over each shattered life, and we have learned how to save other lives in the process.

America is again being asked to answer a cry for help. Our people are ill, their lives rent by ruin, our families being torn apart by the death of a beloved husband, wife, son or daughter.

Exposure in the workplace to toxic and hazardous substances are killing our people.

We're not talking of a sudden or massive one-time exposure to any one or a thousand chemicals. This life-threatening thief works slowly, in small increments of exposure, over long periods of time. Imagine if you will, you take a minute dose of arsenic every day of your life. Your body tolerates and will excrete most, but not all, of the poison you are ingesting. Take enough arsenic, over a long enough time, and the build-up of poison will cause your body to react. It dies.

Now, in addition to that tiny amount of arsenic ingested each day, add a minute portion of any other poison. Now think about the synergy of the two poisons. One or the other may not harm you in the short term, but the chances are excellent that you will die sooner because of the double attack on your body systems.

I would like you to keep that in mind as I explain to you how I became injured and almost died because of the toxic substances we are discussing.

In 1973, with little formal education and a history of low-level, dead-end jobs, I chanced upon an opportunity which offered me a chance to work with a young, struggling and growing sales firm. I could look forward to a 'regular' job with a steady paycheck. A job in which I could grow and learn. I could become part of a hard-working team.

My original job title was 'general office clerk'¹, but that didn't begin to describe all of my duties. Because we were a small company, everyone was expected to, and did, pitch in to help with the workload. Everyone answered phones, took and filled customers' orders.

What were our customers ordering? We carried the finest line of epoxies, adhesives and solvents on the market.² We purchased these chemicals in bulk quantities (5-50 gallon lots) and repackaged/decanted them into smaller containers per our customers' requests. (2 oz. - gallons)

If a customer ordered 2 quarts of a material, one of us - usually our specified warehouse worker, but often whoever was available - would go into the warehouse (stocked with 300 - 400 different products), remove the requested material from a bulk container putting it into a smaller can or jar. Sometimes this was as easy as turning a valve on a drum, but most times it meant we would use a wooden spoon to fill the smaller container. Plunging our hands and arms into the pails and drums, scraping every ounce of material off the sides so there would be no wasted product. Sometimes half of our body would be hidden by the surrounding drum in our efforts to remove the material. The fumes would envelope us, the smell was terrible.

When large or special orders were received, I would often be requested to leave my clerical duties to help out in the warehouse. I spent many days standing 6-8 hours a days over open containers of epoxies and adhesives, getting the material on my hands and arms, in my face and hair. Open containers of other epoxies and solvents surrounded me. I would use Methyl Ethyl Ketone (MEK) as others would use soap and water when my work was finished and I would attempt to clean my work area, tools and my glue-spattered body.

Like so many other people, I gave no thought to the possibility that these products might pose a danger to my health and well-being. There were warning labels attached to most of the containers and data sheets, but all they said was "Keep away from children" or (in the case of flammables) "Keep away from open flame". No children entered our building, and there were rules against smoking in the warehouse, so there didn't seem to be a problem. Besides, if this stuff was dangerous, we wouldn't be selling or using it would we?

One problem developed early. Within 2-3 months of my start date I found that whenever two particular products³ were decanted or opened I would become immediately nauseous and develop a horrendous headache. An hour or so of fresh air seemed to make me feel better. We resolved the problem of my reaction by agreeing to fill orders for these products (whenever possible, and it wasn't always so) at times I was away from the office. Others didn't seem to react so strongly, so took over the filling tasks quite willingly.

It was also about this time, late 1973, early 1974, that I developed a 'flu' that I never seemed to entirely get rid of. For the fourteen years I worked at J.S. Switzer Associates I always seemed to have a cold or sinus problems. I began to tire more easily. There seemed to be more and more days when I just didn't feel 100% well.

As the company became more successful I spent more time on administrative and clerical duties rather than warehouse duty. I only worked in the warehouse when extra hands were necessary. However, my clerical duties still required that I enter and stay in the warehouse several times each day.

At no time during my employment was there any attempt to institute a training program, or any incentive or desire to use or require the use of any safety equipment (masks, protective clothing, ventilators). My desk was located less than twenty feet away from the main filling area of the warehouse. I was less than 10 feet away from open containers of epoxies and solvents. I was separated from the warehouse proper by a thin wooden door. There was no air-conditioning (for the first ten years). Fresh air was obtained

through two small windows or from the loading dock door of the warehouse - the fresh air had to travel around and through the epoxies and solvents before it would reach my work station.

Within a couple of years of employment I began to notice strange looking skin rashes appearing mainly on my hands and arms. They would frequently crop up on other areas of my body as well. The rash would itch and was uncomfortable.⁴

(I made no connection between the rashes and exposure/contact with our products until near the end of my employment - July, 1987)

Starting in 1982 or 83, while still working at J.S. Switzer Associates, I began to undergo massive upheavals in my life. I suffered a depression so severe that I seriously contemplated, and even planned, suicide. I began to react with tremendous hostility, anger and even physical violence to the smallest frustrations. I began to have memory lapses. Tasks I had done yesterday became impossible today because I couldn't remember how they were done. I had been capable of doing the New York Times crossword puzzle, in ink, in a half an hour, and now I couldn't finish a simple TV Guide fun puzzle.

I would go to the grocery store and forget why I was there. Sometimes I was confused as to where I was and how I got there.

I began to experience frightening episodes of heart palpitations and anxiety attacks. I developed unreasonable phobias over common, everyday activities like driving, or being in crowds. (To this day I still have some difficulties in that area.)

I would fall asleep for hours, or be up for days at a time. I lost all desire for food, eventually weighing as little as 90 pounds.

I gradually began having headaches so blinding in their intensity I craved dying as a release from the pain.

During all of this time I was going to the doctor constantly, trying to find out what was wrong with me.

My doctor⁵ could find no reason for my medical problems. She referred me to a therapist for the mental problems, a neurologist for the headaches, an allergist for the skin rashes. All conducted tests, and all results showed normal or above-normal.

Slowly, ever so slowly, I realized the frequency of my headaches were directly related to my work schedule. I began to suspect the epoxies and solvents I had been working with were causing my pain. New Material Safety Data Sheets (MSDS) from the manufacturers were beginning to give indications that these products could and did cause health problems.

In the past I had asked my vendors if these products posed any special risks (usually at the prompting of my customers who were unfamiliar with the various products). I was told⁶ "Sure they're safe...just don't eat them for breakfast!".

I approached my employer, voicing my concerns about the correlation between the headaches and our products. He arranged, at company expense, for me to be seen by a toxicologist, Dr. Frederick Fung. After a thorough physical examination and an on-site visit to test the air contaminations, Dr. Fung opined that I was definitely reacting to exposure to the chemicals in our warehouse and he recommended that I terminate my employment as soon as possible.

After a consultation with my own doctor, it was decided it would be to my benefit if I would terminate employment. This was accomplished in July of 1987.

I applied for and was denied Workers' Compensation Benefits. (I did receive California State Disability payments as my doctor certified as to my inability to continue working.) The doctor provided by the Workers' Compensation Insurance carrier had no experience or background in diagnosing or treating chemical injuries, and refused to even consider the possibility of toxic-exposure induced illness or injury. Other physicians I have consulted, even those not deemed to be experts in the field of toxicology, have been more cognizant of the dangers of chemical exposure and have supported the original diagnosis of (at minimum) chemical sensitivity brought about by the long term exposure to the chemical mixtures at my workplace.

I have appealed the Workers' Compensation decision, but as of this date have received no ruling on my case. Social Security has also denied benefits as they do not deem multiple chemical sensitivity (MCS) as a disabling condition.

My health problems did not disappear along with my job. In January - February of 1988 I began to notice an extreme fatigue, an increased inability to concentrate, joint pains, frequent and severe bruising with no known cause, a drastic loss in appetite coupled with an inability to keep any nourishment or liquids (even water) in my body. There were drastic and frequent bowel upsets, and a susceptibility to a myriad of infections. I was initially diagnosed as having Aplastic Anemia (of which there are two known causes, exposure to radiation or to benzene), later the diagnosis was down-graded to Pernicious Anemia. And now the doctor⁷ admits he has no idea what label he can apply to my mysterious anemia. We do know that it took two blood transfusions, intravenous feeding of liquids, thrice-weekly injections of B-12, and daily doses of Folate and B-12 to stabilize my condition. It also took crossed fingers and lots of prayers. I continue to take the daily doses of medication, and will be required to do so for the rest of my life.

Along with the daily doses of medication, I have a daily dose of fear. What new crisis looms around the corner?

Since leaving my job I've learned a lot about all those wonderful chemicals contained in that warehouse. Nearly every individual chemical, all by itself, can cause diseases and illnesses ranging from skin rashes and headaches to cancer of the lungs or liver or brain. They can cause anemia, leukemia, stroke, brain and nerve damage. Acting in combination, as I was exposed to every day for fourteen years, there is no telling what synergistic effects and tragedy they may wreak.

I have become so sensitized to chemicals of so many varieties, that our everyday environment is a war-zone for me. Going to the grocery store, a dinner out with my husband, or even getting a fill-up for my car is a pain-inducing and frightful experience for me.

Normal social intercourse is at times impossible. The fumes of the perfumes and hairsprays, deoderants and colognes most people think nothing of applying everyday bring on severe headaches and breathing difficulties when worn in my presence. Being in an office, with its' copy machines and air-conditioners and formaldehyde impregnated carpets and walls is impossible for me. The exuded fumes cause pain and dis-orientation.

I sit in my home day after day, dreading the moment when I have to leave. Knowing I could be, will be, exposed to more damage, more pain, by the chemicals so prevalent in making life more pleasant, easier for nearly everyone else.

My husband is as much victim as I. Not only has he stood by helpless, watching his wife dying by the minute, but the desire for a normal, loving marital relationship has been dashed by the sexual dysfunctions my injury has inflicted.

My family and friends no longer have the same healthy, active and sociable daughter and companion they once knew.

Unfortunately, I am not alone in my suffering. I sold these products to thousands of industries across America. Many, many thousands of workers across this great country of ours have come into contact with these poisons, breathed their fumes, hugged their children when they came home in chemically-spattered work clothes. Many of these people are becoming ill, some have already died. There will be thousands more as the years go by, injured and dying.

Several of the witnesses testifying before this committee have used the products I sold, or products similar in nature. Ms. Lori Liberty used my products in the course of her job as an airplane assembler at Lockheed Aircraft Company in Burbank, California. She was a healthy, vital and active young woman when she started her job. She had the hopes that all young people have. She wanted a good job, and someday she would have a husband and children of her own surrounding her in the home she dreamed of.

These toxic chemicals, these poisons, have stolen her future.

They have stolen the future from too many already.

It's time to put a stop to this killer.

FOOTNOTES:

- 1) Later I was promoted to Vice-President and General Manager.
- 2) B.F.Goodrich, Armstrong Products Company of Warsaw, Indiana (division of Morton-Thiokol), Goodyear Chemical Company and others.
- 3) Armstrong Stripper #44, Armstrong Flexresin #1. See attached information sheets and Material Safety Data Sheets.
- 4) I currently am experiencing a skin eruption known as 'Arthus', contracted when I inadvertently came into contact with recently installed carpeting.
- 5) Dr. Josephine Kenyan, cardiologist/internist, Kaiser Permanente, Bellflower, California.
- 6) By a representative of B.F.Goodrich.
- 7) Dr. David Beard, hematologist/oncologist, Kaiser Permanente, Woodland Hills, California.

STATEMENT OF BEVERLY (BILLIE) McCORMICK

STATEMENT OF BONNIE (PAYE) SCHRUM

HEARING: MARCH 6, 1989

UNITED STATES SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SENATOR QUENTIN N. BURDICK, CHAIRMAN

SUBCOMMITTEE ON TOXIC SUBSTANCES, ENVIRONMENTAL OVERSIGHTS AND

RESEARCH & DEVELOPMENT, SENATOR HARRY REID, CHAIRMAN

We are just two of many workers and the experiences that we have had are shared by dozens upon dozens of others. Like many of our fellow workers, we have worked all of our lives, either in industry or in raising families. Like many workers before us, we found the average physician to be ill-equipped to identify or treat toxic exposures in the workplace. Like our fellow workers, and fellow citizens, we found it difficult to believe that in this day and age workers would be permitted to be exposed to chemicals of unknown properties and become severely ill. We assumed that we would be instructed as to proper procedures for handling of chemicals and would be provided and required to use appropriate safety gear. We assumed that we would be advised by chemical manufacturers and our employer of the properties of the chemicals with which we were working. We assumed that workplace conditions were subject

CASEY, GORDON & COHEN, P.S.
700 Pacific Plaza Bldg.
155 - 108th Ave. N.E.
Bellevue, WA 98004

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to effective state and federal oversight. After all, we believed that our work was of importance to our national defense and that the government would assure that those working on its behalf would be protected.

Finally, once it became apparent that numerous workers were sharing a common exposure resulting in a common constellation of symptoms, we never imagined that the workers' reports of illness would be ignored, denied, and minimized, that the injured workers would be subjected to intense scrutiny of intimate details of personal life in an effort to attribute health problems to "stress" or psychological disorders unique to that individual or, paradoxically, that the symptoms would be attributed to "mass hysteria" generally. Adding insult to injury, having been exposed to state-of-the-art chemicals whose properties are unknown, and the synergies of which are as yet unable to be determined, we never expected that the very existence of our illnesses would be denied because medical literature had not yet established, on a more probable than not basis, the correlation between dose and biological response, or the mechanisms of reaction as to these chemicals. The fact that the mechanisms of reaction of many common chemicals: aspirin, penicillin, are not completely understood does not mean that there is no effect; likewise, kevlar, phenolic compounds, formaldehyde, and the like, have effects. Medical literature

cannot keep pace with technological advances; clinical observations must follow illness. The subjects for the experiment in chemical exposure have already been selected (unknowingly): the American aerospace worker. The experiment has been conducted: hundreds of aerospace workers have been exposed. The data is coming in. We should not ignore it for the sake of future workers.

A hundred years ago, one clear-sighted physician described the experience many workers have experienced today at the hands of Boeing Medical and the medical profession:

"[The typical doctor] cannot understand ..., and in the face of it he is himself a layman. This is not a pleasant situation for anyone who as a rule sets much store by his knowledge. So it comes about that ... patients forfeit his sympathy. He regards them as people who are transgressing the laws of his science - like heretics in the eyes of the orthodox. He attributes every kind of wickedness to them, accuses them of exaggeration, of deliberate deceit, of malingerings. And he punishes them by withdrawing his interest from them."

The physician was Sigmund Freud. The patients he was describing were patients suffering from hysteria. How ironic it is that one hundred years later the attitude should have come full circle. Now, workers suffering from toxic exposures are regarded as suffering from psychological disturbances and hysteria in the first instance, before fully exploring the complex additive and synergistic effects of state-of-the-art chemicals.

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Even the head of the medical panel appointed by Boeing, Patricia Sparks, has admitted in her letter of November 4, 1988: "It is important ... to evaluate as large a group of employees working with these chemicals as possible in order to get a handle on any problem that may exist." Workers, singly visiting their family physicians, have little hope that the family doctor will identify the symptoms as being secondary to toxic exposure. With dozens of workers, each different in background and medical history, each unique, yet, within the range of individual variability, all experiencing the onset of symptoms, the evidence of mass toxic exposure becomes undeniable.

Ms. McCormick has been employed with the Boeing Company since March 1, 1985. Ms. Schrum has been employed with the Boeing Company (1967-70), (1980-82), (1984 - present) for a total of nearly ten years. The discontinuous periods of employment for Ms. Schrum were the result of large-scale layoffs of workers.

Ms. McCormick started in the wire shop in Renton in 1985; a year later she received an upgrade to Power Pack and Strut involving wire bundles for engine construction. As a consequence of an on-the-job injury involving repetitive use of large crimping tools, Ms. McCormick sustained a carpal tunnel injury requiring surgery. She returned to work and received a downgrade to a factory clerk position in Auburn five weeks after

her surgery, April of 1987.

Ms. McCormick worked as a clerk thereafter in [17-03] Building 3 and [17-05] Building 5. As a clerk, her services were rotated through various shops. Immediately upon her commencing work in Building 3, Ms. McCormick began to manifest painful choking, tearing, and hoarseness. As she was a clerk "on loan" to the metal shop, she requested a transfer from her supervisor. She was asked to "hang on" for a few days because she was needed badly; several days later she was informed the assignment was permanent. Several weeks later, open sores began to appear in her nasal passages, face, under her eyes and on her upper lip. Ms. McCormick's sores developed into a respiratory infection as a consequence of inhalation of airborne metal particles in the metal shop. Both private and Boeing physicians concurred that the respiratory infection was secondary to inhalation of metal particles. After being out for two weeks, Ms. McCormick returned to work and was sent to Building 2 as a clerk at Stations 1A and 4.

Stations 1, 1A and 4 involved molds for aircraft body parts, spray painting, and layup where aircraft parts were created by wrapping them around the mold previously constructed. The aircraft part was created by wrapping layers of kevlar, fiberglass, graphite, and phenolic materials around the appropriate mold. These were then melded into the proper form.

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As a clerk, Ms. McCormick worked with records, and after late 1987 with a computer terminal, in order to track the parts being constructed. Immediately adjacent to her work station were up to a dozen rolls of the materials to be wrapped over the mold. On weekends, working overtime, Ms. McCormick was constantly moving parts to their work station, wrapping them and preparing them for shipment to other shops.

Ms. McCormick, as a clerk, was given no protective gear, no training, no information, and no warning as to the potential for offgassing from the materials used. Later, when complaints from fellow workers were brought to the attention of management, meetings were held, but clerks were not invited to participate.

The rolls of material in the hot shop environment would actually fume and offgas vapors visibly. During the summer, the shop temperatures would reach into the nineties and, on one occasion while Ms. Schrum was working, the temperatures in Buiding 2 rose to 110 degrees Fahrenheit. Working within one or two feet to rolls of material, Ms. McCormick began to experience headaches and stomach problems. Ms. McCormick asked her supervisor to find out why the windows nearly fifty feet up on the walls of the building remained nailed closed. The general supervisor's response was "security."

In early 1988, Ms. McCormick experienced severe "flu"-like

symptoms, vomiting, diarrhea, crushing headaches, losing ten pounds in nine days. When she returned to work after recovery, within fifteen minutes, she began staggering, having difficulty concentrating. She again left. Four or five days later, Ms. McCormick returned to work. Symptoms reappeared. Within days, Ms. McCormick began to have blood in her urine. Ms. McCormick continued to work, including training two people a day, five days a week despite persistent headaches and stomach pain. Ms. McCormick began once more to have difficulty "getting enough air." Late Spring 1988, Ms. McCormick began to break out in hives. The hives worsened until they became painful welts: Ms. McCormick was forced to go to the Snoqualmie Valley Hospital.

A number of attempts were made to move her to various stations further from the materials as medical doctors had identified the severe welts and hives and joint swelling as a severe reaction to some kind of chemical exposure. Even at Station 9, at the other end of the building, after several days the hives began to reappear together with disorientation and impairment of cognitive function. Station 9 involved receiving parts and supplies and the finished parts storage.

Formerly an active golfer in the company league, Ms. McCormick found herself so tired she was unable to participate. Driving to the league play one day, Ms. McCormick became disoriented and panicked: she simply forgot where she was, where

she was going, on a road she had driven for ten years.

By this time, blood tests confirmed that Ms. McCormick had developed antibodies to various chemicals, thereby establishing that she had been exposed to phenol formaldehyde within the phenolic resins.

Ms. McCormick's symptoms consistently worsened and became reactivated whenever she returned to the workplace.

Ms. McCormick, on July 28, 1988, was instructed by her treating physician only to work in a clean air environment. To this day, Ms. McCormick experiences nausea, headaches, disorientation, dizziness, blood in the urine, impaired cognition and memory lapses, particularly in environments where chemical exposure occurs. She has been sensitized to a wide-range of chemicals and blood tests verify immunological sensitization.

Ms. Schrum started as a riveter. She worked as a shop (dispatch) clerk. After a major layoff, Ms. Schrum worked in tool storage and dispatch. In 1984, she returned to Boeing to work in Building 2 as a plastic bench mechanic. As a bench mechanic, she was wrapping kevlar, fiberglass, and graphite, among other materials around molds in order to make certain

parts for aircraft ductwork, cockpits, and panelling. Phenolic compounds were introduced at a later date. Workers hands, ungloved, were cleansed by rinsing with acetone, tanks of which were readily available in the workplace. When the phenolic materials arrived in the shop, the lead of Station 4, an employee of Boeing for over three decades, reported that years before, when the material had been used, she had difficulty breathing and had broken out in hives. She was angry that the material was being reintroduced.

Ms. Schrum immediately began "not feeling well" when she was working with the materials August 1984. She felt sick to her stomach and experienced "flu-like" symptoms all over: felt hot, cold, shortness of breath, crushing headaches, heat palpitations. She continued to "tough it out" for six weeks. Finally, Ms. Schrum was sent by her supervisor to Boeing Medical because she looked so ill and was immediately picked up by someone. Within days she was hospitalized at Valley Medical. Within two to three days of her release from the hospital after a several day stay, Ms. Schrum had to be hospitalized a second time. The second time she was in screaming, excruciating pain accompanied by non-stop vomiting and diarrhea. After three days to a week, running a high temperature, Ms. Schrum was found to have an enlarged liver and spleen. (Ms. Schrum is a non-drinker.) The doctors did not know the cause of the problems. She was finally sent home. Her condition did not

improve sufficiently to return to work until April 1985. Immediately upon her return to work, she again began to feel sick. Within a month she was once more unable to work. She returned to work once more, but in June was again sent to Boeing Medical with the same symptoms. Each attempt to return to work resulted in Ms. Schrum becoming ever sicker. Struggling to continue to work, Ms. Schrum would return time and again just to suffer immediate sickness increasing to disabling illness. For nearly four years, Ms. Schrum struggled in this manner. No doctor could explain the symptoms. Ms. Schrum had become disoriented and unable to function. One day her adult children visited her to find her in a tree - she could not remember why she was there. She passed out once while filling her car with gasoline. Finally, in March 1988, Dr. Gordon Baker saw Ms. Schrum and recognized ~~her~~^{her} symptoms as being consistent with the many cases of chemical sensitization and poisoning he had seen over the years of his practice. Ms. Schrum was diagnosed as having organic brain syndrome: she has a permanent impairment of her memory, chronic fatigue, inability to function, loss of higher executive functions, with confirmation of loss of neuropsychological functioning. Such diminution of function is consistent with chemical sensitization.

The symptoms experiences by Ms. McCormick and Ms. Schrum are experienced to a greater or lesser extent by dozens of workers. Some workers have neuropsychological deficits so severe that their limitations parallel those of "Alzheimer's." One such

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worker can no longer identify his wife and has forgotten he has children. He was recently institutionalized for a brief period of time. He is thirty-eight.

It was widely reported by fellow workers that their fans had been taken to Station 4 during air quality testing by the State of Washington and NIOSH/OSHA. Areas where testing was to be conducted were always cleaned first. This raises questions as to the validity of testing. It is fair to conclude that air level testing was not performed at times which accurately reflected workplace conditions similar to those to which workers were exposed. Testing of the air does not reflect measurement of levels to which workers are exposed by skin contact; ambient air testing for gases does not reflect levels of exposure to particulate matter. Testing for one chemical does not reveal the presence of any other chemical. No testing yet devised accurately reflects the complex synergies and chemical interactions involved in multiple chemical exposures to human beings.

There is a pervasive feeling among the Boeing workers with whom we have had contact that reporting on health concerns will adversely affect employment. As a consequence, many workers do not report their symptoms and attempt to work despite injury to their health. On a daily basis, female employees in the women's restroom could be seen weak, shakey, and vomiting. When it was

suggested that the workers report to Boeing Medical, they indicated that they were afraid to do so for fear of losing their jobs. They indicated that management was aware of the problem but that the material was "here to stay". Management indicated that FAA required use of the materials.

With respect to information respecting proper handling procedures for state-of-the-art chemical compounds, workers were neither instructed in proper handling techniques, provided with appropriate safety gear, nor provided with material safety data sheets. Requests for these data sheets resulted in responses such as: "We do not have them", "You must get those from Boeing Medical", and "They are not available." The workers were told that: "There's nothing in this material that will hurt you." Safety gear was limited to protective glasses and safety shoes. While some workers handling materials directly were provided with gloves on rare occasions (because the gloves were "\$26 a pair"), the workers who suffered indirect exposures were not provided with materials. One worker who used safety equipment was reduced to tears by the general supervisor. This worker reports that she was told: "If everyone went through safety gear the way you do, this Company would go broke."

Chemical manufacturers did not label materials in such a manner so as to be visible to the ultimate user, nor did they undertake in any manner to provide the workers with information

or training respecting proper work procedures with the chemicals provided. It is suspected that the chemicals gave rise to risks beyond those reasonably to be anticipated by the ultimate user, the worker and, perhaps, by Boeing itself. Workers would have greatly benefitted from direct instruction from chemical manufacturers as to the properties of the chemical compounds with which they were working, safety procedures, and required gear.

We welcome the review by the Committee.

Gordon P. Baker, M.D.
14203 Ambaum Blvd. SW
Seattle, WA 98166
(206)243-9004

AERO-SPACE WORKERS SYNDROME: A DISEASE OF OUR ADVANCED TECHNOLOGY

by Gordon P. Baker, M.D.

New composite materials are widely used in the aero-space and other industries. These materials have been released into the workplace without proper regard for their effects on the health of the workers. Chemicals are being used without adequate health and safety data, without proper testing, and without giving some workers the necessary protective equipment, ventilation, and training that are essential to safely use these toxic industrial materials. This policy, or rather lack of policy, is all too apparent in the present epidemic of chemical poisoning now occurring in workers exposed to phenol-formaldehyde resins and

other materials used in the manufacture of aircraft parts.

In August of 1987, Boeing started to use phenol formaldehyde resins in the 1702 building in Auburn. Almost immediately, workers got sick. It took a while to realize that many serious problems were due to exposure to this material. I first saw workers with these problems in February and March of 1988. In March 1988 I was contacted by Mr. Robert Ripley, the Aero Space Workers Union Business Representative in Auburn. He told me there was a big problem with illness in many of his people and he asked me to help evaluate them.

By now I have seen over 130 Boeing workers, and also workers from other aero space contractors using similar materials. While there may be some differences in individuals in the presence or absence of certain symptoms or in overall severity of their illness, there is a definite pattern of symptoms and findings which are unique to this group and are both unprecedented and unexpected in a general allergy practice. Many of these patients have seen doctors without getting a definite diagnosis since most physicians do not have experience with patients with these problems.

Of the first 100 patients from Boeing, 41 are from the Auburn 1702 building and 59 are from other Boeing facilities. Overall, there are 67 females and 33 males. In the Auburn 1702 building, there are 32 females and 9 males.

Table No. 1-Symptoms

Total number examined, 100: 67 females and 33 males

<u>Symptoms</u>	Total-All Areas (100 patients)	Building 1702 (41 patients)	
	<u>Number (=%)</u>	<u>Number</u>	<u>%</u>
Skin rash	52/100	18	44
Eye irritation	68/100	31	76
Upper respiratory irritation	85/100	35	85
Nosebleeds	25/100	11	27
Cough/wheeze	47/100	23	56
Shortness of breath	46/100	24	59
Chest pains	35/100	20	49
Nausea	24/100	11	27
Diarrhea	24/100	11	27
Blood in urine	5/100	5	12
Dizziness	39/100	22	54
Headache	71/100	32	78
Irritability	70/100	32	78
Personality change	52/100	27	66
Fatigue	75/100	34	83
Depression	57/100	28	68
Memory lapse	68/100	30	73
Decreased sex drive	31/100	17	41

Other symptoms present, but not tabulated: Menstrual problems, problems with pregnancy, joint and arthritic symptoms.

§ § §

While all of these symptoms are very troublesome to the patients, the worst by far are those related to the central nervous system. Psychiatric evaluation with neuropsychological testing consistently reveals the presence of organic brain syndrome or organic brain poisoning. Organic brain syndrome may be defined as any change in the structure or function of the brain. This is a most serious consequence and will result in a greatly decreased quality of life because of loss of memory, intellectual capacity, and the ability to cope with both work and the everyday environment. Even after the patient leaves the toxic exposure, the memory loss and other symptoms attributable to the toxic brain poisoning may persist to some degree indefinitely.

Dr. George Zerr, a psychiatrist with considerable experience with this problem, is evaluating many of these workers and is establishing a definite diagnosis of organic brain syndrome or toxic brain poisoning. His results should be available soon.

Immunological laboratory procedures are now available to help diagnose these workers. The immunologic tests show a characteristic pattern, which is not expected in the normal population.

- (1) The affected workers may have antibodies to a

formaldehyde-serum albumin conjugate or to a similarly prepared TMA (trimellitic anhydride) conjugate. (TMA is a plasticiser which is widely used.) These antibodies are markers of exposure. They do not indicate disease per se. However, the Antibody Assay lab checked 100 normal control patients and not one had positive tests to Formaldehyde.

Among Boeing patients, 64 have anti-formaldehyde antibodies. 35 have antibodies to TMA.

(2) A second group of immunologic tests measures the presence of autoimmunity, or antibodies directed against the patient's own body. In a normal population, not over 5% would have autoimmune antibodies. In the Boeing population, out of these 100 people, 43 have auto antibodies. Of these 43 people with auto antibodies, 8 have two, and 2 people have three different auto antibodies. The auto antibodies are directed against tissues such as smooth muscle of intestine or blood vessel, stomach, kidney, liver mitochondria, or antinuclear antibody. 8 out of 21 tested have anti-myelin antibodies. (Myelin is the material in nerve sheath.) Normal people do not have anti-myelin antibodies, but people with multiple sclerosis do have anti-myelin antibodies.

(3) A third immune test measures the presence of a group of activated lymphocytes called Ta-1 cells which are elevated with chemical poisoning or infections. Of 31 Boeing patients tested, 25 have elevated Ta1 cells. None of the 28 controls have

elevated T4 cells.

(4) Interleukin-1 is produced by damaged white blood cells called macrophages. Early on in a chemical exposure, IL-1 is elevated, and later may be decreased.

Of these 31 patients, 14 have elevated IL-1, 5 decreased IL-1, and 12 are normal.

Among its many properties, IL-1 causes fever, inflammation, cartilage cell breakdown, promotes fibroblast (or scar tissue cell) growth, stimulates bone osteoclast cells (which cause absorption of bone), cause muscle inflammation, and may be involved in rheumatic disease and myalgia or muscle inflammation. IL-1 may be found in the fluid in joint inflammation and in periodontal disease. Some of the most severely ill workers have the highest levels of IL-1.

Pulmonary function tests show decreased lung function in 61 and normal values in 21 of these workers. Since 62 of the workers I examined are either smokers or ex-smokers, and they did not have lung function tests before they were exposed to the toxic resins, I cannot make an exact comparison of the effect of the exposure on their lungs at this time. Smoking has been shown to greatly increase lung damage from other pollutants. However, many of these patients do have symptoms directly related to their lungs which were not present prior to exposure.

Unfortunately, there is no treatment at this time for this chemical poisoning. The best we can do for these workers is to

identify the problem and get them out of the offending area. Many of these people are too ill to work. Their prognosis is varied, depending on the degree of exposure, the time the person was in the offending area, and the individual's own resistance. But overall, their prognosis seems to be very poor.

Some patients may be able to work in a clean environment. Many have developed sensitivities to other vapors, fumes, chemicals, pollutants which effectively removes them from the workplace. Several of these patients have developed dementia and will never work again. After six months to a year, the patients' health is poor.

In addition to the patients I saw who were from the Boeing Auburn plant and other Boeing plants, I have talked with patients from other companies who are working with similiar materials. There is a are wide spread, serious health problems throughout the industry now they're using the new composite materials. Yet these health problems are not really new. Reports in the toxicology journals as early as 1949 point to the toxicity of phenol-formaldehyde, which may degrade or self destruct to at least 12 to 16 different toxic substances, none of which have been taken into account or sampled in these work environments.

It is of the greatest urgency that adequate safety is ensured in the workplace wherever these materials are used. The unfortunate victims of these chemical poisons should be properly cared for, and not be subjected to harassment, demotion,

termination, or forced to continue working in unhealthy work environments until they can work no more.

TESTIMONY OF GEORGE J. ROBINSON, DIRECTOR
OCCUPATIONAL SAFETY/HEALTH AND COMMUNITY SERVICES
- INTERNATIONAL ASSOCIATION OF MACHINISTS AND AEROSPACE WORKERS
BEFORE THE
SUBCOMMITTEE ON TOXIC SUBSTANCES
ENVIRONMENTAL OVERSIGHT RESEARCH AND DEVELOPMENT

MARCH 6, 1989

Mr. Chairman, I appreciate the opportunity to appear before this Subcommittee on Toxic Substances, Environmental Oversight Research and Development.

My position with the International Association of Machinists and Aerospace Workers (IAM&AW) is Director of Safety/Health and Community Services. I have served in this position for eleven years. Prior to that, I served as a Directing Business Representative and Business Representative for eighteen years. I have held other positions in our union, such as, Chief Steward, Shop Steward and Local Lodge Officer. My membership covers thirty-five years. I am also currently on leave of absence from United Airlines where I worked as an Aircraft Mechanic.

My testimony will cover the adverse working conditions in the Boeing Plant in Auburn, Washington and the Lockheed Plant in Burbank, California.

In June 1988, I received a letter from Mr. Bob Ripley (Exhibit 1), an elected IAM Business Representative of District Lodge 751, Seattle, Washington. Bob represented IAM members in the Boeing Auburn Plant in Washington. His letter addressed a number of health problems some of our members were experiencing while performing duties handling pre-pregs or using advance composite materials.

Basically, these operations involve the handling of resin-impregnated fibrous materials, or pre-pregs. Although some operations require that the composite be composed at the job site and then applied to the fabric, or wet lay-up. The fabric may be comprised of fibrous materials such as, Fiberglas, kevlar, and carbon and may contain components such as asbestos. The advance composite usually consists of an epoxy resin and a curing agent such as phenol formaldehyde or methylenedianiline.

The toxicity of the resin structures varies with each curing agent posing different hazards. For example, a recent advisory committee report indicates that methylenedianiline is a human carcinogen. Formaldehyde has been regulated by OSHA as a probable human carcinogen (Exhibit 2). In addition, there are a number of solvents to which the workers are exposed. Some of which

cause varying degrees of anesthesia, headaches, lightheadedness, "drunkenness" and even unconsciousness. Glycidyl ethers are often used as diluents in epoxy resin systems and are formed by the reaction of various alcohol with epichlorohydrin. As with epoxy resins in general, they can be both irritants and sensitizers of the skin. Some of these compounds have been associated in laboratory animals with adverse effects on the blood cell-forming system and on the testes, including testicular atrophy with decreased spermatogenic activity. Positive tests for mutagenicity for some glycidyl ethers have been reported but only one, butyl glycidyl ether was mutagenic in mammals in the dominant lethal test. Tumorigenic activity in laboratory animals has also been reported (Exhibit 3).

In addition, recent data indicates that worker exposure to the man-made mineral fibers including glass fibers, rock-wool, and slag wood should be viewed with concern. Recommendations made from a meeting on MMMF in London, Jan. 26-27, 1987 and sponsored by the Thermal Insulation Manufacturers Association, indicate that these fibers should be treated as potential carcinogens.

Thus, there are a number of hazardous materials which these workers must handle on a routine basis and to which they are exposed. Mr. Ripley's letter was regarded with much concern.

Before responding to Mr. Ripley's letter, I met with the union hygienist, Suzanne Kossan-Lowman. As a result of those discussions, I wrote a response (Exhibit 4). In this letter I covered health problems that could result from exposure to phenol formaldehyde resins because of off gassing of formaldehyde and phenol vapors. Each of these in a gaseous form, can cause serious respiratory problems, skin problems, fluid build-up in the lungs, digestive problems, headaches, fainting, and, perhaps, even mental disorders. In addition, formaldehyde is regulated as a probable human carcinogen. Also, NIOSH states that the use of a flame retardant known as antimony trioxide posed serious additional health risks such as dermatitis, respiratory disease, and cancer. I did not address the health hazards associated with all of the chemicals to which these workers are exposed, because many of them had not been identified. Instead, in my letter, I offered to visit the plant in question and assess the hazards to which these workers were exposed. After

receiving a written invitation I traveled on August 16, 1988 to Seattle, Washington.

On August 17, I visited the Boeing Auburn Facility. The tour of the plant lasted nearly eight hours. During the plant tour, I observed the following:

1. Ventilation, for the most part was lacking, and when in place was not sufficient to protect workers from exposure to hazardous substances (even though the company had just recently installed a new ventilation system). It was obvious that many of the health problems Mr. Ripley reported could be attributed to the lack of proper ventilation;

2. Workers were not wearing protective apparel (gloves, smocks, respirators) where necessary;

3. Not one worker I spoke with during this entire tour admitted to any training regarding the exposure hazards posed by the chemicals they routinely handled; and

4. There was No labeling of hazardous chemicals only a Boeing number on the container. Material Safety Data Sheets were not readily available and, in fact, for the most part, were lacking. The failure to provide training, labeling of

hazardous materials, and to maintain Material Safety Data Sheets is a gross violation of the 1988 OSHA Hazard Communication Standard, Amendment 1910.1200. Clearly, this regulation (Exhibit 5) requires that the employer:

- 1) Identify and list hazardous chemicals in their workplaces;

- 2) Obtain MSDS's and labels for each hazardous chemical;

- 3) Develop and implement a written hazard communication program, including labels, MSDS's and employee training, based on the list of chemicals, MSDS's and label information; and
- 4) Communicate hazard information to their employees through labels, MSDS's and formal training programs.

This is 1988. The OSHA standard has been in place since 1986 and Boeing still has not achieved compliance with the Hazard Communication Standard (Exhibit 6). Furthermore, Boeing doesn't appear to be taking any actions to do so! We recognize that the Washington Occupational Safety and Health Administration is a state plan. However, like all state plans, they must operate as effectively as Federal OSHA in the enforcement of regulations. Boeing must comply with the Hazard Communication Regulation. However, it should be noted that State OSHA Inspectors have failed in their duties and responsibilities because they have not forced compliance with this "life saving" regulation -- even after repeated employee complaints were made.

Regarding employees complaints, Boeing's early response to reported illnesses from chemical exposures was to either fire or demote the employees making complaints. In fact, during my second visit to Seattle on October 20, 1988, I was furnished with a lengthy list of names of workers, shown to me by Directing Business Representative, Tom Baker of employees who had made complaints and whom the company dismissed or demoted. Boeing has now agreed to rescind its earlier action of discharge or demotion and has agreed to reinstate these workers. Copy of this agreement has not been made available to me. Boeing also established a committee of physicians to review the medical compensation claims of some thirty-seven employees. However, has steadfastly refused to honor work related compensation to employees who complained of chemical poisoning. In fact, the Boeing Company is self-insured under the State Compensation Plan and Aetna insurance company handles these claims. To date, I am unaware of any employee compensation claim (due to chemical poisoning) being paid through Boeing's self-insured protection plan. Thus, I can only conclude that Boeing's establishment of this committee was nothing more than a "white wash."

Upon evaluation, it appears that the Boeing Company is not even concerned with detecting the apparent work place hazards which exists. In fact, Boeing even refused to circulate a health questionnaire offered by the union (Exhibit 7), which we believe would identify those workers adversely affected by the work place environment and afford the opportunity for corrective actions to be taken. We only requested that our questionnaire be circulated among those employees who work in manufacturing of parts and assemblies, using fiber products. Not the entire work place population.

Refusing to distribute this questionnaire has limited our ability to identify employees adversely affected and to afford the company the opportunity to provide relief for these workers. Nonetheless, based on the limited amount of data which we have acquired, we believe that employee health problems at Boeing's Auburn Facility are serious. Our findings have been substantiated by Dr. George Baker of Seattle, Washington. He has examined somewhere in excess of one hundred workers, and in my discussions with Dr. Baker, I'm convinced of the seriousness of this situation.

I also surveyed the Lockheed Plant in Burbank, California. The health hazards in this plant are assumed to be similar to those detected

at Boeing. However, because of claims to security measures, I was unable to enter this plant and assess the work place environment. My determination that a hazard exists in this plant was based solely on employee complaints.

I did attend a lengthy meeting with Lockheed officials on October 7, 1988. This meeting consisted of a large gathering of union and company officials. We discussed employee health complaints, including the current law suits filed by Lockheed employees, naming the Lockheed Corp. and other companies as plaintiffs. To my knowledge, workmen's compensation claims filed by Lockheed employees involving chemical poisoning are still under investigation and no one person has been compensated.

I will, however, state for the record, that the Lockheed Corporation appeared concerned in this meeting and did willingly assist the union in circulating a health questionnaire (Exhibit 8). The survey questions contained in this questionnaire were similar to the ones prepared for Boeing.

As a result of the distribution of this questionnaire, it was reported that some seven hundred surveys were mailed and that 79 were returned, which represents a 10% return rate.

While we would like to have had 100% return, 10% is considered good for a mailed survey. Results of the Lockheed survey are attached (Exhibit 9).

Employee responses indicated that some of these employees had been adversely affected by the work place environment. As evidenced by the numerous complaints of memory loss. Based on these findings, I contacted Dr. Kaye Kilbur, of the University of Southern California, and provided him with copies of the health surveys. I asked that he evaluate the forms and give his opinion, if any, on potential or possible health problems which exist.

After evaluating these surveys, Dr. Kilburn expressed concerns for the health of the workers in this facility. Based on the opinion of Dr. Kilbur, our industrial hygienist, Susan Lowman, and myself, I wrote to our Business Representative, Bryan Carver (Exhibit 9), asking him to propose to the company that additional studies were necessary. We anticipated that an epidemiological study with a control group would be needed to determine the cause of the adverse health effects reported by the workers. It was our belief that this type of study would provide the necessary information to determine the source of exposure and would aid in identifying the appropriate controls.

While serving as a participant in the Mediated Rulemaking Committee for the Occupational Safety and Health Administration, I was made aware of a similar study done at the Boeing facility in Philadelphia, Pennsylvania. The workers in this facility also engaged in the impregnation of fabrics to be used in helicopter manufacturing. The epidemiological study conducted by the National Institute for Occupational Safety and Health detected an increased incidence of bladder cancer in workers exposed to methylenedianiline, the curing agent used in this advance composite. This study has brought a new awareness of the health hazards associated with exposure to these advance composites. Our committee recommended to the Secretary of Labor that occupational exposure to the curing agent, methylenedianiline should be reduced to ten parts per billion and that dermal contact with the substance should be avoided.

There were many things which our Committee determined concerning exposure to this substance. We found that once this material is deposited on the skin that it can not be removed easily. In fact, we found that soap and water only removed 50% of the material and that the use of a solvent to remove this substance increased absorption. We believe that the workers at Lockheed may also be

exposed to methylenedianiline and thus may also be at increased risk of contacting bladder cancer.

We believe that this type of study conducted at the Lockheed facility will help provide the information necessary to insure that safe working conditions are achievable for all employees who are working in the field of Advanced Composite Technology. We, however, have been unable to persuade this company to engage in this activity. This company seems reluctant to identify the chemicals responsible for the adverse health conditions which exist in the employees of this facility. Your committee may, however, provide some relief for these working people. Through, the open process of these hearings, the pleas of these working men and women have been heard. We thank you for allowing those who have not theretofore, had an opportunity to speak out in a public forum of this magnitude, to speak.

Thank you Mr. Chairman

George J. Robinson, Director
Occupational Safety/Health
and Community Services

INDUSTRIAL HYGIENE PROBLEMS
ASSOCIATED WITH RECOGNITION AND ASSESSMENT
OF EXPOSURE TO COMPOSITES

Peter A. Breysse
University of Washington
MS, MPH, CIH

Peter A. Breysse, Associate Professor Emeritus
Department of Environmental Health SC-34
School of Public Health and Community Medicine
University of Washington
Seattle, Washington 98195
(206) 543-4252

Testimony
United States Senate
Committee on Environment and Public Works
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Abstract

Over 100 Boeing employees working with composites that are bonded with a phenol formaldehyde resin reported developing symptoms shortly after their resin was substituted for an epoxy compound.

Problems complicated by exposure at times to work place temperature 90 to over 100° F along with significant overtime work involving seven days a week with one day off a month.

Industrial hygiene investigation stymied by present occupational health standards which do not appear adequate for some complex mixtures such as phenol formaldehyde resins.

Excellent industrial hygiene practices were carried out when the use of the offending resin was cut back and then removed and ventilation added.

Introduction

Industrial hygienists play a most significant role in attempts to minimize the overall occurrence of adverse occupational health effects including those likely to occur in the manufacture and use of composites. More often than not, the industrial hygienist is the first health professional contacted when workers develop problems. Unfortunately other occupational health professionals and management executives view industrial hygienists as operating exclusively in the areas of evaluation (monitoring) and control.

Graduate school degree programs for preparing professional industrial hygienists stress anticipation, recognition, evaluation and control of industrial health problems.

With a graduate degree or an appropriate undergraduate degree and one year of professional experience, the budding industrial hygienist is eligible to start on a program of certification administered by the American Board of Industrial Hygiene. The initial step involves successfully completing the Industrial Hygiene in Training exam. After four more years of professional experience a specialty examination must be successfully completed. Specialities include the Comprehensive Practice (CP), Engineering (E), Chemistry (C), Acoustical Aspects (A), Air Pollution Aspect (AP), Radiological Aspect (R) and Toxicological Aspect (T). Persons certified in any of the above aspects may utilize the designation CIH. Industrial hygienists can be certified in more than one aspect.

The comprehensive Practice Specialist often serves in a capacity of a forensic scientist. The CIH is usually the first to be contacted, requesting assistance, and may very well be the first health professional to visit the problem site.

Prior to the site visit, it is desirable to obtain as much information as possible. Information concerning when the problem first occurred, how many employees were involved, what were their symptoms and of course what chemicals or materials were involved.

During the site visit, workers are interviewed and monitoring may be necessary. It may also be necessary to monitor at other times. When all of the available information, including a literature search, has been assembled, reviewed, and digested, a report is prepared indicating the most probable source or sources of the health problems as well as recommendations for further evaluation if needed and methods for preventing future reoccurrences.

As a Comprehensive Practice Industrial Hygienist, the author's involvement in the composite problem began in September, 1987 when a telephone call from a Boeing employee seeking information and assistance for health problems she was experiencing shortly after the epoxy-resin used in a pre-preg system was replaced by a new resin. She was a plastic bench mechanic who prepared pre-preg panels for vacuum bag lay-up. She was under the impression that the new resin contained formaldehyde. Her symptoms included skin rash, headache, irritation of the eyes and upper respiratory tract along with memory lapse problems and fatigue.

Questioning indicated that she had contacted her supervisor who stated that there was no problem. She had not seen a Material Safety Data Sheet (MSDS) nor had she been provided health hazard information or training. She had contacted a union representative who was unaware of any problems.

She was advised to see a physician, preferably one experienced in occupational and/or environmental health problems and also to attempt to procure an appropriate MSDS to show

to the physician. If the physician concluded that her symptoms were occupationally induced then an industrial insurance claim should be filed. She was also informed that she could contact the consultant of the Industrial Hygiene and Safety Division, Washington State Department of Labor and Industries, who after she completed an appropriate form would conduct an investigation without divulging her identity if she so desired.

Shortly after this inquiry a Boeing industrial hygienist was contacted and informed of the concerns as was the union. It was suggested to the union that a preliminary investigation be conducted in an attempt to learn the full extent of the problem and to obtain an MSDS.

Later the union did provide an MSDS and two pre-preg samples. The MSDS indicated that the resin was of the phenol formaldehyde type. Analysis of the pre-preg samples was conducted by the laboratory of the Department of Environmental Health for the presence of formaldehyde. Preliminary results indicated that the red backed pre-preg yielded 700 μg of formaldehyde per gram of sample and the pink backed pre-preg 1580 μg of formaldehyde per gram of sample. Gas chromatography and mass spectroscopy GC/MS analysis detected in decomposition products, phenol and an unidentified organic compound exhibiting behavior like that of an organic acid. This information was reported to the union representative. Pre-preg samples were later supplied by the Boeing Company.

The next association with this problem resulted from a telephone call in early summer from a reporter (Seattle Post Intelligencer) requesting information about possible exposures to phenol-formaldehyde resins. He had previously been called by an employee who was concerned about how her situation was being handled. Later on Dr. Gordon Baker called indicating that he had examined some 50 patients working with Boeing who had developed various symptoms following the introduction of phenol formaldehyde resin in their shops.

Dr. Baker is a Seattle area physician with an allergy practice. Since that initial call, the number of patients has increased to over 100.

Gas and Vapor Exposures

Both the Washington State Department of Labor and Industries and the U.S. National Institute of Occupational Safety and Health (NIOSH) performed industrial hygiene investigations in the Boeing shops in question. The Department of Labor and Industries investigations occurred on May 25, 1988 and June 6, 16, and 20, 1988. All contaminant results (Table I) were well below their Permissible Exposure Limits (PEL).

Table No. I

Summary of WISHA Monitoring Results

Contaminant	Number of Samples		Sample Results		WISHA PEL
	Building No. 2	4	Building No. 2	4	
5-25-88					
Formaldehyde	4	0	0.004 ppm (TWA)		1 ppm-TWA
			0.004-0.073 ppm (STEL)		2 ppm STEL
Phenol	4	0	< 0.01-0.04 ppm		5 ppm
6-9,16,20-88					
Formaldehyde	10	6	0.01-0.03 ppm	<0.08 ppm	1 ppm TWA 2 ppm STEL
Phenol	9	0	0.001-0.5 ppm	-	5 ppm
Acetone	4	4	2.3-7.6 ppm	< 1 ppm	750 ppm
Methylene Chloride	2	4	0.1 ppm	< 1 ppm	100 ppm
Styrene	2	4	1.2 ppm	< 1 ppm	100 ppm
Antimony Trioxide	4	0	<0.01 mg/m ³	-	0.5 mg/m ³
Amines	0	2	-	< 0.2 ppm	1 ppm

n-hexene	0	4		< 1 ppm	50 ppm
Total particulates	4	0	0.48-1.1 mg/m ³	-	10 mg/m ³

Results of a NIOSH investigation conducted July 6 and 7 were reported in a correspondence to Mr. Ripley, Union Representative, Aerospace Machinists. Formaldehyde concentrations ranged from nondetectable to a high of 0.073 mg/m³. the WISHA limit for formaldehyde is 1.2 mg/m³ (1 ppm) as a time weighted average with 2.4 mg/m³ (2 ppm) as a Short Time Exposure Limit (STEL). NIOSH on the other hand utilizes an occupational standard for formaldehyde of Lowest Feasible Limit (LFL).

Three atmospheric samples analyzed by GC/MS contained various C₉ - C₁₂ alkanes plus C₉ - C₁₀ aromatics such as trimethylbenzenes and diethylbenzenes. One sample contained formaldehyde and an unknown, probably an alcohol/ether compound.

Bulk sample results analyzed at different temperatures by GC/MS identified compounds including formaldehyde, ethanol, isopropanol, phenol, salicylaldehyde, MIBK, ethyl acetate, toluene, MEK and several compounds not identified. These included a couple of alcohol/ether type compounds and a series of higher boiling phenyl compounds.

NIOSH also performed a Health Hazard Investigation. Report pending.

Industrial hygienists of the Boeing Company have also performed extensive monitoring.

None of these investigations turned up results that were in violation of any state standards.

Unfortunately some general atmospheric techniques utilized to assess potential health hazards of worker exposed to toxic chemicals are relatively ineffective. This is especially true

for complex mixtures involving resin formulations, some of which have been developed for use in composites.

A number of technical difficulties are apparent. In many instances all resin by-products have not been identified, and if identified information on toxicity may well be absent. Two examples follow:

Example I. In mid 1982 an administrator of a State agency requested assistance from the Field Response Team to determine if possible the source or sources of symptoms experienced by staff members immediately after a carpet had been installed. The carpet was installed on a week end with an adhesive. On Monday, what was described as a "very offensive" odor was discernable by all employees. Beginning on Tuesday and continuing for 3 weeks, 20 of 35 employees were absent from work with time lost ranging from one hour to a maximum of 14 days. Total lost time amounted to 521 hours.

Table II. Symptoms reported by the State Health Department experienced by employees:

24	Headache	10	diarrhea
21	irritation of eyes	9	cough
19	irritated throat	8	muscle aches and pains
18	nausea	7	burning in nose
16	dizziness	6	fatigue
11	tearing of eyes	6	dark urine
10	chest tightness	5	rashes

When inquired about what made symptoms better, 18 stated staying away from office while 25 indicated that staying in the office made symptoms worse. The carpet company and the adhesive company both reported by telephone that bonding agents were styrene-butadiene-latex resins. Atmospheric monitoring did not reveal the presence of any contaminants in

amounts likely to constitute a substantial health hazard when compared with present standards. Analysis of a bulk sample indicated a total chromatogram of 68 peaks representative of a petroleum based solvent mixture.

When reviewed individually, concentrations of contaminants did not explain the reported health problems.

In 1984, University of Arizona¹ staff members discovered a common prominent emission product from 3 carpet samples. That contaminant was 4-phenylcyclohexene resulting from the styrene-butadiene-latex compounds used to bond carpet fibers to the backing.

Since 4-phenylcyclohexene was not commercially available, it was necessary to synthesize it for further research. Results of that preliminary research indicated that it does not appear to be a skin or eye irritant. Pulmonary tissue response was evaluated by injecting 2 μ L of 4-phenylcyclohexene into the surgically exposed trachea of 4 rats. At the end of 15 days the animals were sacrificed and examined. Hemorrhaging was noted within the lungs of 2 of the 4 rats. The bronchioles were primarily impacted and lactate dehydrogenase from lung lavage was elevated approximately 400% suggesting cellular damage.

Example 2. Researchers in Sweden² reported isolating a number contact sensitizer in resins based on phenol formaldehyde. Prior to this series of studies only 4 sensitizers were recognized in phenol formaldehyde compounds including 2-methyl phenol, 4-methyl phenol, 2,3,6-trimethyl phenol and formaldehyde. Eleven new contact sensitizers were isolated utilizing guinea pigs and humans.

This study did not examine the possible effects of respiratory exposures.

The above examples reinforce the conclusion that there is still a great deal to learn about resin mixtures and by-products.

Exposure to Fibers and Non-Fiber Particles

In addition to monitoring for gases and vapors, the State of Washington industrial hygienists also monitored for the presence of fibers and dust. Results (Table 1) reported total particulates ranging from 0.48 mg/m³ to 1.1 mg/m³. Scanning Electron Microscopy (SEM) indicated that glass fibers were observed.

Man made mineral fibers are considered to be potentially carcinogenic when these fibers possess the same diameter and length-to-diameter ratio as asbestos fibers. As an example, ceramic fibers may be utilized in some composites. A SOHIO MSDS for Fiberfrax a ceramic fiber includes the following:

Product Hazard Summary

Health Warning!

MAY BE HARMFUL IF SWALLOWED
MAY BE IRRITATING TO SKIN, EYES, AND RESPIRATORY TRACT
POSSIBLE CANCER HAZARD BASED ON TESTS WITH LABORATORY
ANIMALS

Respiratory Protection

Use NIOSH or MSHA approved equipment when airborne exposure limits are exceeded. NIOSH/MSHA approved breathing equipment may be required for non-routine and emergency use. Ventilation may be used to control or reduce airborne concentrations. Acceptable respirators recommended for airborne ceramic fiber concentrations exceeding 2 fibers/cc are:

Concentration

Respirator Type

2.0-5.0 f/cc	3M 8710 or equivalent
5.0-50.0 f/cc	Survivair full face piece with high efficiency filter 1090-00 or equivalent
> 50.0 f/cc	MSA 01-00-06 full face piece type C supplied-air of equivalent. OSHA approved air source required

Pending the results of long-term health effects studies, engineering control of airborne fibers to the lowest levels attainable is advised.

Hazardous Ingredients/Identity Information

<u>Ingredient</u>	<u>CAS number</u>	<u>OSHA PEL</u>	<u>ACGIH TLV-TWA</u>
Petroleum Process Oil	64742-30-9	5mg/m ³ oil mist	5mg/m ³ oil mist
Mineral Wool Fiber (Nuisance Particulates)	None	15mg/m ³ total dust 5mg/m ³ respirable fraction	10mg/m ³

Health Hazard Data

Primary Routes of Entry: Inhalation, Skin and Eye Contact

Acute: Mineral wool fiber and other nuisance particulates may cause transitory skin irritation (itching) and possible irritation of eyes and upper respiratory tract.

Chronic: The World Health Organization's International Agency for Research on Cancer (IARC) has classified mineral wool as Group 2B, "possibly carcinogenic to humans". Based on studies in which mineral wool was injected or implanted in laboratory animals (artificial means of exposure), IARC concluded there was limited evidence of cancer in animals. This classification did not consider the lack of cancer in animals exposed by inhalation, the normal means of exposure.

Based on some epidemiologic studies, IARC concluded there was limited evidence of an association between mineral wool and cancer in production workers.

100% concentration of petroleum process oil has been shown to be a carcinogen on the skin of laboratory animals in the absence of normal hygiene over a two year period.

Carcinogenicity: NTP - NO IARC - 2B OSHA - NO

Medical Conditions Aggravated by Exposure: Any condition which may be aggravated by mechanical irritants.

Information on the bag containing Certainteed Kraft Faced Roll of fiber glass states.

CAUTION

This fiber glass wool insulation may cause skin, eye and respiratory irritation. Based largely on experiments in which laboratory animals were exposed artificially to glass fibers by injection or surgical implantation, fiber glass wool has been classified as possibly carcinogenic to humans. When handling and/or applying insulation:

Contains some fibrous glass dust, urea, polymer with formaldehyde, phenol and asphalt.

A further complicating factor concerns exposure to man made mineral fibers and dust particles that have resin residues or other contaminants attached. Need to determine if those attached compounds increase the health hazard potential due to skin contact and inhalation.

Other Environmental Factors

Metabolic job requirements, temperature condition and increased working hours could well have an additional influence on worker health. Increases in temperature and metabolic job requirements could result in discomfort and more important heat stress. Increased breathing rates associated with increased metabolic requirements of certain tasks will also increase the amount of contaminants inhaled. Add significant overtime to the above and the results could be drastic.

When questioning some of the employees about their work environments, it was mentioned that building 1702 was a wooden structure constructed during World War II for use as cold storage for cadavers. This building was void of adequate ventilation and workers reported temperatures of over 100° at times in the summer.

Employees also mentioned that they were required to work seven 8 hour days a week with one day off a month. Some mentioned working seven-10 hour days and one individual indicated that he only had one day off every two month.

As mentioned previously, Dr. Baker has over 100 patients who work for Boeing, most with Composites. Of 41 identified as working in building 1702, 9 were males and 32 females. Symptoms include:

Table No. III
Symptoms - Building 1702
Dr. Baker's Patients

Total number examines, 41, 9 males, 32 females

Symptoms	Number	%	Symptoms	Number	%
Eye irritation	31	76	Dianrhea	11	27
Upper respiratory irritation	35	85	Dizziness	22	54
Skin rash	18	44	Shortness of		
Cough/whoeze	23	56	breath	24	59
Headache	32	78	Fatigue	34	83
Nose bleeds	11	27	Irritability	32	78
Blood in urine	5	12	Depression	28	68
Nausea	11	27	Memory lapse	30	73
Chest pains	20	49	Loss of sex drive	17	41
Personality change	27	66	Other 3-Menstrual problems	2-joint pains	

In addition to a physical exam, some or all of the following tests were performed.

Table No.IV
Tests on Dr. Baker's Patients
Antibody Assay Lanboratories

Lymphocyte Surface Markers

Total T Cells
Total B Cells
T Helper Cells

T Suppressor Cells
 IL2 Receptor Cells
 Ta1 Positive Cells
 H/S Ratio

IL1 Production by monocytes

Autoantibody screen

Antinuclear antibody
 Antimitochondrial antibody
 Antosmooth muscles antibody
 Antiparietal antibody
 Antibrush border antibody

Antibodies to:

Formaldehyde	IgE	IgG	IgM
Trimellitic anhydride	"	"	"
Isocyanates	"	"	"

Antibody assay laboratories provides the following information with references upon request to users and nonusers of their service.

BIOLOGICAL MONITORING FOR IMMUNE DAMAGE DUE TO XENOBIOTICS ALAN BROUGHTON M.D. AND JACK D. THRASHER PhD.

Monitoring the health risks of environmental hazards includes:

- Ambient Monitoring:** Assesses the health risks by measuring the external exposure to the chemical.
- Biological Monitoring of exposure:** Assesses the health risk by evaluating the internal does.
- Biological Monitoring of effects:** This aims at identifying individuals with signs of adverse health effects eg. Increase in hepatic enzymes in cases of exposure to hepatotoxic chemicals or proteinuria in the case of nephrotoxic chemicals.

Rapid increases in our knowledge, and the increasing availability of tools to monitor the immune system, has permitted the development of biological monitoring of effects on the immune system.

EFFECTS OF CHEMICALS ON THE IMMUNE SYSTEM.

Until recently it was the generally accepted view that certain chemicals affect the immune system by inducing a state of allergy or hypersensitivity in the patient. This often resulted in the production of asthma (TMA and reactive dyes) or skin hypersensitivity (formaldehyde).

More recently other effects have been noted; these include the production of immunological lung disease (silicosis, berylliosis, and farmers lung), activation of the macrophages by insecticides (malathion) and the demonstration of immunosuppression by dioxin.

We have recently demonstrated indices of immune activation in patients exposed to low levels of formaldehyde, trimellitic anhydride, and toluene diisocyanate, as well as Chlordane (acute and chronic exposure), trichlorethylene and perchlorethylene. The parameters of immune activation are the presence of activation markers (Ta1) on the T lymphocytes and the appearance of autoantibodies to a variety of tissues.

We have also observed that in acute exposure there is an increased production of interleukin 1 by the macrophages and in chronic exposures a reduction of interleukin 1 production. The mechanisms involved are unclear, but the following working hypothesis is worthy of note.

Xenobiotics undergo metabolism by the liver, usually using the cytochrome p450 enzyme system, often producing highly reactive chemicals such as epoxides as intermediaries before final water soluble excretory compounds. These epoxides are capable of damaging local cells and exposing autoantigens and the activation of the immune system with the production of the Ta1 cells marker.

The epoxides also activate the phagocytosing macrophages, which results in the in vitro production of increased amounts of interleukin 1. Further exposure results either in an inability of the macrophage to respond, or the production of interleukin 1 inhibitors such as prostaglandins.

One of the more significant contaminants from the view point of neurobehavioral aspect is formaldehyde. Neurobehavioral manifestations were reported in two groups of histotechnology technicians exposed to formaldehyde and solvents in the preparation of human and animal tissue for examinations. In one investigation, 420 technicians were surveyed to determine possible adverse health effects³. Formaldehyde concentrations of 0.4 of over 5.0 ppm were obtained during a short check of tissue preparation. Findings included perceived impairment of memory, mood, balance, and sleep together with additional neurobehavioral symptoms frequently associated with formaldehyde in other studies.

The second study involved 76 histology technicians⁴ along with a control group of 56 secretaries and clerks, all from the same hospital. The technicians were found to suffer greater frequencies of lack of concentration, loss of memory and disturbed sleep.

Two groups of formaldehyde exposed male employees⁵ were compared with a control group of 26 unexposed male hospital workers. Forty-five male fiberglass batt producers averaged combined frequencies of neurobehavioral, respiratory and dermatological symptoms of 17.3 and 10.7 for hot and cold work area respectively. Eighteen make histology technicians averaged 7.3 combined frequencies for the above mentioned symptoms while the 26 controls averaged 4.8.

Neurobehavioral symptoms included sleep disturbances, insomnia involving difficulty in falling asleep, frequent waking and sleeping for only a few hours. These symptoms along with concentration loss, recent and remote memory loss, instability of mood and irritability were all increased with exposure.

Discussion

The occupational health limit for formaldehyde is 1.0 ppm based on an 8 hour time weighted average along with a Short Term Exposure Limit (STEL) of 2.0 ppm. While atmospheric concentrations of formaldehyde in Building 1702 were low, hours of exposure of some ranged from 56 to 70 hours/week. It is also well to keep in mind that occupational health standards were never developed to protect all exposed workers. Individual sensitivity is critical. These standards are also based on a 40 hour work week. In addition epidemiologic data utilized in the development of occupational health standards was obtained primarily from studies involving white males. Finally a major drawback is associated with the effectiveness of both monitoring and analytical techniques employed in assessing atmospheric environments involving complex mixtures. No one absorbant will likely collect all contaminants nor will the most sophisticated analytical methods identify all of the compounds detected.

FACTS AVAILABLE

1. Symptoms--Reported After Introduction of Phenol Formaldehyde
2. Complex Mixture--Many By-Products--Some Not Identified.
3. Similar Problems With Other Complex Mixtures--Ex Styrene--Butadiene--Latex in Carpets
4. Formaldehyde's Potential for Neurobehavioral Effects
5. Formaldehyde present in low concentrations, however for extended work periods
6. Epidemiological Data Based on White Males
7. Work Shifts
8 hours/day 7 days/week
1 Day Off/Month
8. PELs Based on 8 hours/day--40 hours/week Not Designed to Protect All Workers
9. Some Work Areas--Poor Ventilation--Discomfort--Heat Stress
10. Skin Contact--No Gloves Immediately Difficult to Work with Gloves
11. Workers--Reluctant to Report Health Problems
12. Phenol Formaldehyde Resin Removed--Ventilation Added--Health Problems Reduced

Conclusions

The most probable cause of the symptoms reported by composite workers resulted from exposure to phenol formaldehyde resin and resin by-products plus extended work periods along with the addition of discomfort and possible heat stress as well as employee reluctance to report health problems to management. Good labor management relations are critical.

There is no doubt that the larger aircraft companies will be able to develop composite workplace environments that minimize adverse safety and health problems. On the other hand, serious problems are more likely to develop in composite operations performed by

small companies under contract. Many small companies do not usually possess the finances necessary for adequate engineering controls, nor are they likely to employ professional safety and health personnel whose responsibilities would be to anticipate, recognize, organize, evaluate and recommend controls for occupational hazards.

It is also well to recognize the potential hazards of aircraft repair and maintenance operations involving composites. Minimizing health and safety problems, considering the complexity of repairing composite materials and structures, is a formidable task.

To maximize the effectiveness of health and safety programs associated with the use, maintenance, and repair of composites, requires a professional health and safety staff, periodic surveillance, and a continuous program of employee and supervisor health and safety training. Finally the ultimate key to, and the most critical factor for program success mandates close cooperation between employees and management.

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Advancing psychology as a science, a profession, and as a means of promoting human welfare

TESTIMONY OF

Robert L. Balster, Ph.D.

Professor of Pharmacology and Toxicology

The Medical College of Virginia

on behalf of the

AMERICAN PSYCHOLOGICAL ASSOCIATION

before the

UNITED STATES SENATE

Subcommittee on Toxic Substances, Environmental Oversight

and Research & Development

Committee on Environment & Public Works

on the subject of

TOXIC MATERIALS IN THE AEROSPACE INDUSTRY

March 8, 1989

The Honorable Harry Reid, Chairman
216 Hart Senate Office Building

1200 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 955-7600

Mr. Chairman, thank you for the opportunity to testify concerning toxic substances in the aerospace industry. I am Dr. Robert L. Balster, Professor of Pharmacology and Toxicology at the Medical College of Virginia, located in Richmond, Virginia. I am a psychologist interested in the toxicity of chemicals that are present in the workplace and in the environment, and in their impact on human behavior and functioning. In addition, I am a member of a committee of the American Psychological Association (APA) that has been following the Toxic Substances Control Act (TSCA) - the major federal statute concerned with the regulation of toxic chemicals. I am here today on behalf of APA's 90,000 members, who include psychologists with interests in various aspects of normal and abnormal psychological functioning.

In my testimony today I want to focus on three important issues that bear on the cases at the Boeing and Lockheed facilities. First, I want to draw attention to the pervasiveness of potentially toxic chemicals and the serious lack of scientific data on these substances. Second, I will point out some debilitating defects in the Toxic Substances Control Act (TSCA) which provides the Environmental Protection Agency (EPA) with its regulatory authority. Finally, I will highlight substantial funding problems at EPA which prevent that agency from conducting or sponsoring the kind of research that is necessary to make informed regulatory decisions affecting the workplace and the environment.

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Behavioral and Neurological Toxicity

As a neurobehavioral toxicologist, I am not surprised at the symptoms of dizziness, irritability, loss of memory and concentration reported by the workers at the Lockheed Burbank Facility and the Boeing Seattle area plants. These are all neurobehavioral effects following human exposure to toxic substances. Exposure to chemical substances can result in adverse effects on the nervous system, including impaired sensory and motor function, cognitive and intellectual performance, and emotional well-being. In severe cases some substances can cause paralysis and death. (see Table 1).

The occupational medicine literature is full of dramatic examples of the negative effects of exposure to chemicals in the workplace. One such example is the industrial chemical, carbon disulfide, which is used in rayon manufacturing. This chemical can produce disorders of vision and nerve weakness, increases the incidence of suicide, and eventually produces, a raging, raving mania. Inorganic mercury which is also used in manufacturing processes, is more subtle, producing social withdrawal, "fidgetiness", a propensity to blush, and absentmindedness. The "Mad Hatter" of Lewis Carroll's Alice in Wonderland was a caricature of this occupational malady.

Another example involves lead. In fact, the toxicity of lead has been a concern since Hippocrates first recognized lead toxicity in the mining industry. More recently, the May 1987 issue of the New England Journal of

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Medicine reported effects of lead in the nervous system of children exposed in utero to levels that were thought to be safe until now. Because of extensive research on exposure to lead, we now know that blood levels below the current criteria for lead poisoning may justify removal for medical reasons of women of child-bearing age from work environments where lead exposure is likely.

Manganese, another metal, is highly toxic when relatively large amounts are ingested. Hundreds, and possibly even thousands of miners in various countries have suffered from "Manganese madness" characterized by hallucinations, unusual behavior, and emotional instability, as well as numerous neurological problems (see Figure 1).

Organic solvents are a particularly toxic class of industrial chemicals because they are typically volatile, i.e. when exposed to air they rapidly change from liquids to gases that can be easily inhaled. Solvents are used in glues, cements and paints. Inhaling these substances can cause permanent, severe degeneration of nerve cells. A variety of solvents including hydrocarbons, ketones, and various combinations of these have resulted in neurological problems in the occupational setting (see Table 2). A case in point is an instance that occurred in 1973 where workers at a fabric production plant were discovered to be suffering the effects of neuropathy, or degeneration of nerve fibers. Extensive screening of employees revealed dozens of individuals with serious neurological problems.

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It was found that they had been regularly exposed to methyl-n-butyl ketone, a dye solvent and cleaning agent introduced to the plant the previous year.

Another case involved BMMH (Lucel-7,) a catalyst used in the manufacture of reinforced bathtubs. At a plant in Lancaster, Texas, the substance had only been used for a few weeks before workers began experiencing a number of neurological symptoms ranging from dizziness and muscle weakness to vision disturbances and memory loss. Animal studies conducted after the exposure demonstrated that rats experience adverse effects similar to those seen in humans. It is likely that BMMH would not have been marketed had appropriate tests been conducted.

The Need for Toxicity Testing and Research

Chemicals have become an integral part of our daily lives. However, all too frequently, the toxicity of existing and new chemicals is unknown. The National Academy of Sciences (NAS) addressed the need for toxicity testing and research in a 1984 report entitled "Toxicity Testing: Strategies to Determine Needs and Priorities". This document was commissioned by the National Institute of Environmental Health Sciences to: 1) characterize the toxicity testing needs for substances to which there is known or anticipated human exposure for the purpose of regulating such substances; and, 2) to develop and validate uniformly applicable and wide-ranging criteria by which

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to set priorities for research on substances with potentially adverse public health impact.

The study determined that more than 65,000 chemicals to which humans are likely exposed are in use in the United States and approximately 1,500 new substances are introduced each year. Very few of these chemicals (pesticides, food additives, cosmetic ingredients, drugs, and chemicals in commerce at three different levels of production) have been tested to determine if they adversely affect the nervous system. For example, only 34% of the pesticides reviewed have been tested adequately enough to conduct at least a partial assessment of their potential hazard to human health. The situation regarding chemicals used in industry and commerce is much worse. For 90% of these approximately 48,000 chemicals, even a partial health-hazard assessment is impossible. Equally disturbing is that for large numbers of chemicals - 38% of pesticides and their inert ingredients, and approximately 80% of the chemicals in commerce categories - no toxicity data at all are available. The NAS concluded that "it is clear that thousands or even tens of thousands of chemicals are legitimate candidates for toxicity testing related to a variety of health effects..." and that neurobehavioral toxicity evaluation is one of the highest priority toxicity testing needs.

As the NAS report suggests, we do not have neurobehavioral toxicity test data on the suspected substances at the Lockheed and Boeing facilities.

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Unfortunately, this is the case not only for the aerospace industry, but also for a wide variety of industries (see Table 3).

Testing for Neurobehavioral Toxicity

It is unfortunate that so many neurobehavioral toxicants are identified on the basis of human exposure with unanticipated health effects. If the problems in the aerospace industry under investigation today, in fact, originate from toxicant exposures, this may be another case where new neurobehavioral toxicants are identified. Clearly, we should not be using the American worker as a testing laboratory for toxic chemicals.

The field of neurobehavioral toxicity assessment is relatively young scientifically. Most of the research in the field has been with known toxicants in an attempt to develop valid test measures and to investigate mechanisms for neurotoxic insult. On the other hand, this research has clearly shown that various animal models can be very useful in predicting neurotoxicity. I am unaware of any known human neurobehavioral toxicant that does not have comparable effects in one or more animal systems. At least that would appear to be true for chemicals which have been carefully examined in animal models. Thus, animal testing currently forms the essential basis of neurobehavioral toxicity assessment. Knowledge of chemical structures likely to produce effects on the nervous system and data

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from various in vitro biochemical or physiological tests can be very useful to guide animal testing, but at the current time cannot replace it.

Under TSCA, animal testing guidelines have been developed for use in evaluating neurobehavioral toxicity. These tests are quite general and are used with the expectation that at least the most serious neurobehavioral toxicants can be identified. It is important for Congress to know that these tests cannot be relied upon to detect all subtle or specific neurobehavioral effects. In other words, there will be compounds incorrectly identified as safe. On the other hand, it is my opinion that this battery of tests is a reasonable basis for identifying at least the most toxic compounds. The problem right now is not with the tests but with the failure to use them to evaluate the vast majority of chemicals found in the workplace. More information about the test guidelines developed for use under TSCA can be found in the Federal Register, Vol. 50, No. 188, September 27, 1985. For a brief summary of EPA's current neurobehavioral toxicity test guidelines see Attachment.

When chemicals are selected by the EPA for testing, it has usually been the case that only a few of the available tests are employed. One of the concerns that the scientific community has is that the full battery of tests is rarely used. These tests are not redundant. They are designed to evaluate different aspects of neurobehavioral toxicity, and/or to establish dangerous levels of exposure or critical developmental periods when risk

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would be greatest. It is the important task of the EPA Office of Toxic Substances to make decisions about whether to require testing of existing and new chemicals and to determine which of the tests are appropriate. Currently, this office has only one trained neurobehavioral toxicologist to assist in making these critical decisions.

The Toxic Substances Control Act

The Toxic Substances Control Act, enacted in 1976, vests the EPA with the power to monitor, investigate and regulate chemical substances. Congress clearly intended TSCA to be a vehicle for acquiring toxicity (including neurobehavioral toxicity) data on existing and new chemicals to facilitate the control of toxic chemicals that may harm human health or the environment. In describing the effects for which testing may be required, the statute states:

"The health and environmental effects for which standards for the development of test data may be prescribed include carcinogenesis, mutagenesis, teratogenesis, behavioral disorders, cumulative and synergistic effects, and any other effect which may present an unreasonable risk of injury health or environment."

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Problems inherent in TSCA since its passage in 1976, however, have worked to undermine the realization of TSCA's purpose. The heart of TSCA is the requirement for premanufacturer notification (PMN). Under section 5(a), a manufacturer must notify EPA ninety days before producing a new chemical substance, defined as any chemical not listed on a specially compiled inventory list. Notification is also necessary even for older chemicals, already on that list, if the administrator concludes that there is a significant new use which increases human or environmental exposure. However, despite these requirements, it is sadly the case that the majority of PMNs submitted to EPA contain no data on neurobehavioral toxicity.

As written, TSCA places the burden on EPA to show proof of potential risk in order to require toxicity testing of new and existing chemicals. Yet, EPA must often attempt to determine the risk posed by chemicals in the absence of any toxicity data at all. In most cases involving new chemicals, EPA must rely on structure activity analysis to predict neurotoxicity. This approach, however, is not adequate for the task because, while the structures of chemicals are known, the nature and extent of their activity in the nervous system is usually not known.

General EPA policy is to postpone toxicity testing until a chemical is produced in large volume or used in ways that increase exposure. But, in this regard, EPA has failed to monitor changes in volume and use or to require systematic reporting by manufacturers in order to enforce its volume

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and use policy. Hearings conducted by the Committee on Science and Technology, U.S. House of Representatives, in the 99th Congress, on "Neurotoxins: at Home and the Workplace", examined this issue in detail.

The APA recommends that legislative action be undertaken in the 101st Congress, possibly as a result of today's hearing, to make TSCA a stronger and more effective law.

EPA Health Effects Research

In order to appropriately assess potentially toxic substances, EPA must have a data base upon which to make informed decisions, based on sound, scientific knowledge. EPA Intramural and extramural research programs should provide the basic knowledge EPA needs to formulate strategies and innovative solutions to the problems it confronts. This kind of information comes from long range research programs, not experiments directed at the chemical of the moment.

APA is greatly concerned about current and proposed levels of federal funding for health effects research at EPA, given the number of potentially toxic substances found in the workplace today about which we know virtually nothing. In particular, we believe that the two EPA research programs which fund this type of research - the Health Effects Research Laboratory and the

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Exploratory Research Grants Program - are grossly underfunded and receive an inordinately small portion of the total EPA research budget.

The Health Effects Research Laboratory (HERL) at Research Triangle Park, NC, is devoted principally to the study of adverse health effects. The research conducted there includes studies of the wide range of pollutants known or suspected of causing health problems. Roughly one-third of the research focuses on air pollutants, on third on water pollutants, and the rest on toxic substances and pesticides. The major mission of HERL is to provide scientific data to enable EPA to conduct scientifically valid risk assessments. To achieve this requires that the laboratory emphasize research on hazard identification, dose-response studies, extrapolation and dosimetry.

The HERL program consists of both intramural and extramural research. For the extramural program, there has been no real growth in funding since 1982. Indeed, HERL's extramural funds, which supplement the intramural work of the laboratory, have actually declined in real dollar terms since FY 1985. For instance, the total budget for HERL in FY 1982 was \$40 million and has grown to only \$45 million in FY 1989, a miniscule increase of \$5 million over a seven year period. For FY 1990, only \$50 million is requested in the President's budget proposed for HERL. HERL funding for neurobehavioral toxicity research is even more disturbing, growing from a mere \$2.8 million in FY 1982 to only \$ 4.0 million in FY 1989.

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The Exploratory Research Grants Program has focused principally not on the problem of the moment, but on problems that will continue to confront EPA in the years ahead. The extramural program provides grant funds in five areas: health biology, engineering, air physics and chemistry, and water physics and chemistry. Through the health program, advances have been made recently on waterborne viral agents, the process of toxic particle ingestion, cross-species extrapolation, and toxicant-induced memory impairment.

The funding history of the Exploratory Research Grants Program is problematic in that since 1981 the dollars allocated to this program have declined consistently (Figure 3). From a high of \$22 million in FY 1981, funding for the program dropped to an all time low of \$7.5 million in FY 1989. In fact, if funding for the Exploratory Research Grants Program had kept pace with the cost of conducting research, as measured by the Biomedical Research and Development Index, it would have been funded at approximately \$65 million in FY 1989, rather than \$7.5 million. Only \$8.2 million has been requested by the President for FY 1990. Similarly, the health research component of the program would have been funded at approximately \$38 million, rather than \$2.0 million. Clearly, there has been a dangerous erosion of research efforts which would help to protect human health from the adverse effects of chemical exposure.

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APA recommends a significant expansion of both the HERL and the Exploratory Research Grants Program. An authorization and appropriation of at least \$35 million for the Exploratory Grants Program would help to restore a level of funding (in real terms) to this program that existed in FY 1981. Similarly, with regard to HERL, by increasing the budget from \$45 million in FY 1989 to at least \$60 million in FY 1990 Congress would help to restore EPA's ability to fund high quality science.

To put these numbers into some perspective, it is useful to highlight the costs of not conducting adequate research on the toxicity of potentially harmful substances. Under the Federal Insecticide Fungicide and Rodenticide Act, EPA registers pesticides after it examines data provided by the manufacturers. After registering the pesticides for use, EPA frequently discovers adverse effects that require suspension of marketing of the material, indicating the inadequacy of the original data and testing techniques used to register the pesticides in the first place. In 1987, EPA paid approximately \$30 million in indemnities for the herbicides, 2,4,5-T and alivex. The FY 1987 and FY 1988 costs for storage of these two chemical and EDB were about \$8 million. How many other pesticides will be suspended and how many tens of millions lost as better data emerges? Against this context, we reiterate that the long-range extramural health research budget of the agency is only \$2.0 million in FY 1989.

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Finally, I would like to bring to the Subcommittee's attention to a soon to be released Office of Technology Assessment (OTA) study entitled "Neurotoxic Substances: Identification and Regulation". APA representatives are serving on advisory panels for this study. The study should address many of the issues that I have raised in my testimony. The study was commissioned by several members of Congress to explore the current hazards posed by neurotoxic substances, the federal regulations to protect public health and the environment, the practices for neurotoxicity testing by private and public organizations, and the efficacy of these practices in identifying neurotoxicity. The APA is hopeful that this OTA study will draw public and Congressional attention to this important public health and environmental issue.

Mr. Chairman, I thank you for this opportunity to testify on this issue, and I would be pleased to answer any questions that you may have.

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Attachment

TSCA Neurobehavioral Toxicity Test Guidelines

1. Neuropathology. Animals exposed to the test compound are euthanized and portions of their nervous systems are removed for the identification of lesions or structural abnormalities. This type of testing can identify exposure levels associated with frank neuropathology, but it is important to recognize that many neurotoxicants would not be detected in this procedure because they act by altering the function of the nervous system.

2. Peripheral neuropathy. This guideline utilizes electrophysiological procedures in animals exposed to the toxicant. Measures of nerve conduction velocity, response amplitude and chronaxy are used to evaluate the damage to the peripheral nervous system. These tests are very useful for identifying toxicants which produce peripheral neuropathies, but would not necessarily detect agents which directly affect the brain.

3. Delayed neurotoxicity. This is often called the "hen test". It is a very specific test for identifying cholinesterase inhibitors which produce delayed neurotoxicity. Its greatest application is for testing this class of pesticides. Hens and humans are particularly sensitive to this type of

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neurotoxicity. In the "hen test", both behavioral and histopathological changes are evaluated after either acute or subacute exposure.

4. Neurotoxic esterase. This is a biochemical test for the formation of aged inhibited neurotoxic esterase, the form of the enzyme that produces the delayed neurotoxicity referred to above.

5. Functional observation battery. This is a very general screening test for evaluating neurobehavioral toxicants with unknown effects. It calls for the very systematic observation of the behavior of rats exposed to the test compound. The battery also includes measures of some reflexes and muscle control. Many chemicals acting upon the nervous system would be expected to alter one or more of the measures included in this battery. Thus, this test is particularly useful for initial evaluations. On the other hand, this test would not necessarily detect all neurotoxicants, especially those with a very subtle or selective effect. It would also be unlikely to detect an agent that affected higher processes such as learning or that produced personality changes.

6. Motor activity. Rats are usually used for this test as well. Mechanical counters are used to automatically record the level of general activity of exposed animals. This test is also a very general screening test for diverse types of neurobehavioral toxicants. Because the results

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are quantitative, is easier to use the data from this type of testing for establishing minimal levels of exposure associated with behavioral effects.

7. Schedule-controlled behavior. This test is designed to measure more subtle effects of possible neurotoxicants on learned behavior. Typically, rats are trained to press switches to obtain food and then they are exposed to the test agent. Methods from experimental psychology can be used to train animals to perform fairly complex behavioral sequences. This test is generally more sensitive and quantitative than typical screening tests and should be able to determine exposures with more subtle effects on behavior.

8. Developmental neurotoxicology. Research has shown that the developing fetus and very young organisms are often far more sensitive to neurotoxicants than adults. A number of animal models have been developed to examine the effects of prenatal and/or early postnatal exposure on offspring. Although a TSCA guideline has not been written for developmental effects, the EPA has a concern in this area and a test rule has been developed to obtain this type of data on at least one chemical. This test rule could be used to establish testing conditions for other compounds as well. This type of testing would be particularly important when exposures of pregnant women or very young children are anticipated.

Table 1 - Neurobehavioral Effects Following Exposure to Toxic Substances

<u>MOTOR EFFECTS</u>	<u>MOOD/PERSONALITY EFFECTS</u>
convulsions	sleep disturbances
weakness	excitability
tremor/twitching	depression
lack of coordination/unsteadiness	irritability
paralysis	restlessness
reflex abnormalities	nervousness/tension
activity changes	delirium
	hallucinations
<u>SENSORY EFFECTS</u>	<u>GENERAL EFFECTS</u>
equilibrium changes	loss of appetite
vision disorders	depression of neuronal activity
pain disorders	narcois/stupor
tactile disorders	fatigue
auditory disorders	nerve damage
<u>COGNITIVE EFFECTS</u>	
memory problems	
confusion	
speech impairment	

SOURCE: Adapted from Anger, 1986.

Figure 1

Neurological and Psychological Signs and Symptoms, Collected From Clinical and Experimental Sources, Attributed to Metal Toxicity

	ALUMINUM	ANTIMONY	ARSENIC	BORON	CADMIUM	LEAD	MANGANESE	MERCURY	NICKEL	SELENIUM	TELLURIUM	THALLIUM	TIN	VANADIUM
ANOSMIA			•		•									
APPETITE LOSS		•						•			•		•	•
CONVULSIONS						•		•						
DEPRESSION				•						•				•
DISORIENTATION	•			•			•					•		
DIZZINESS		•	•						•	•			•	
DYSARTHRIA	•						•	•						
FATIGUE, LETHARGY		•	•		•			•		•		•		
HEADACHE		•	•	•				•	•				•	•
INCOORDINATION, ATAXIA	•					•	•	•				•		
INSOMNIA									•					
JITTERINESS, IRRITABILITY		•		•			•		•					•
MENTAL RETARDATION						•		•						
PARALYSIS	•													
PARESTHESIAS		•	•					•					•	
PERIPHERAL NEUROPATHY	•		•		•	•		•						
POLYNEURITIS		•	•					•					•	
PSYCHIATRIC SIGNS	•					•	•	•	•				•	•
SOMNOLENCE										•		•		
TREMOR	•					•	•	•						•
VISUAL DISTURBANCES			•			•	•	•		•			•	•
WEAKNESS			•	•		•	•	•	•	•			•	

SYMPTOMS ASCRIBED TO METAL TOXICITY

Note. Based on Weiss, 1983.

Table 2 Chemical groupings in which 10 or more neurotoxic chemicals are found

Alcohols	Glycol derivatives
Alicyclic hydrocarbons	Halogenated aliphatic hydrocarbons contain- ing Cl, Br, and I
Aliphatic and alicyclic amines	Halogenated cyclic hydrocarbons
Aliphatic carboxylic acids	Ketones
Aliphatic hydrocarbons	Metals
Aliphatic nitro compounds, nitrates, and nitrites	Nitrogen compounds
Aromatic hydrocarbons	Organic phosphates
Cyanides and nitriles	Organic phosphorus esters
Esters of aromatic monocarboxylic acids and monoalcohols	Organic sulfur compounds
Ethers	Phenols and phenolic compounds

Source: Clayton and Clayton 1981-82.

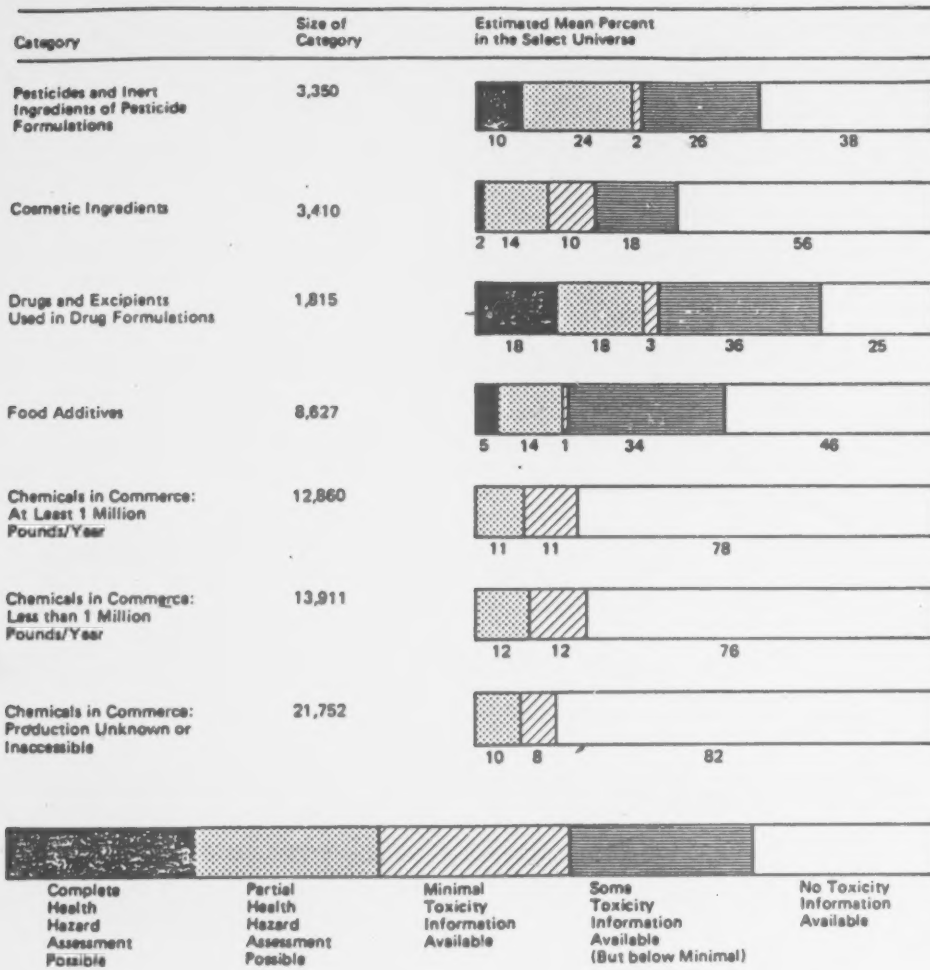


FIGURE 2 Ability to conduct health-hazard assessment of substances in seven categories of select universe.

SOURCE: 1984 National Academy of Sciences Report, Toxicity Testing: Strategies to Determine Needs and Priorities

Figure 3: EPA Exploratory Research Grants Program

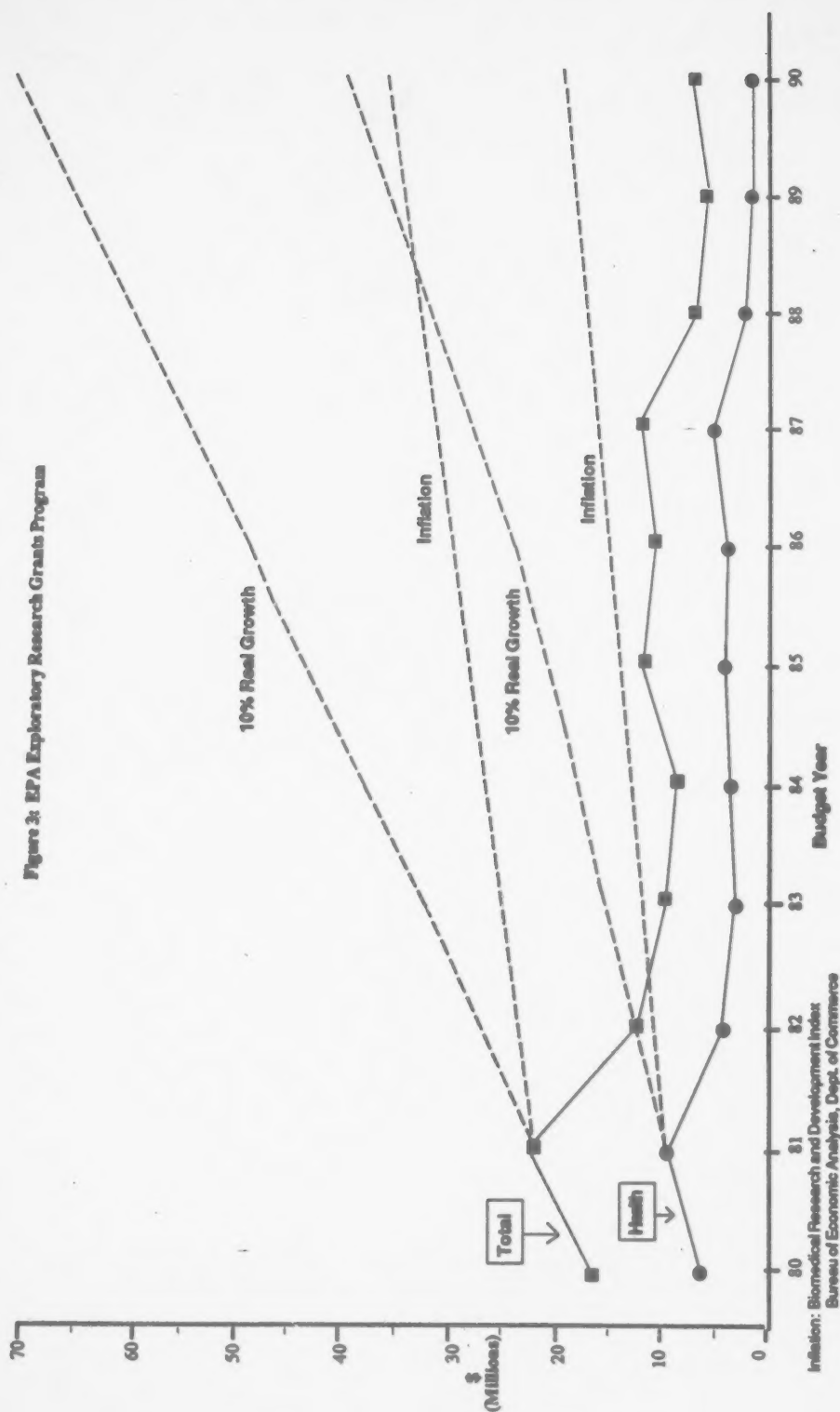


Table 3 SIC classifications and industries in which neurotoxic chemicals are found

07	Agricultural services and hunting	34	Fabricated metal products
13	Oil and gas extraction	35	Machinery, except electrical
16	Heavy construction contractors	36	Electrical equipment and supplies
17	Special trade contractors	37	Transportation equipment
19	Ordnance and accessories	38	Instruments and related products
20	Food and kindred products	39	Miscellaneous manufacturing industries
21	Tobacco manufacture	41	Local and interurban passenger transit
22	Textile mill products	42	Trucking and warehousing
23	Apparel and other textile products	44	Water transportation
24	Lumber and wood products	45	Transportation by air
25	Furniture and fixtures	46	Pipeline transportation
26	Paper and allied products	50	Wholesale trade
27	Printing and publishing	54	Food stores
28	Chemicals and allied products	55	Automotive dealers and service stations
29	Petroleum and coal products	58	Eating and drinking places
30	Rubber and plastics products	72	Personal service
31	Leather and leather products	73	Miscellaneous business services
32	Stone, clay and glass products	75	Auto repair, services and garages
33	Primary metal industries	80	Medical and other health services

SOURCE: W. Kent Anger, 1988

The Testimony of Alan Broughton M.D.

To the Toxic substances, environmental oversight, research and development subcommittee of the US Senate Committee on the Environment and Public works. MARCH 6 1989.

Toxic chemicals in the indoor air have received little attention by Public Health Authorities as causative agents of indoor air-related illness. The rationale behind this lack of activity results from the fact that indoor chemicals are present in concentrations less than those established by the Occupational Health and Safety Administration (OSHA) for various toxic chemicals, e.g. benzene, formaldehyde, styrenes, etc. OSHA work place standards are, in general, established after years of experience which associates a certain disease, (e.g. leukemia and benzene, asthma and trimellitic anhydride, asbestos and lung cancer) with a given chemical exposure. Such experience does not exist with respect to contaminated indoor air.

Although each chemical found in the indoor air of a home or building is present in concentrations less than OSHA recommendations for that chemical. These toxic chemicals can act either synergistically and/or additively with other chemicals to potentiate toxic and health effects. In other words, simultaneous exposure to two toxic chemicals either lowers the dosage threshold at which each is toxic and/or they add to each other's toxicity. As a matter of fact, we have heard health authorities categorically state that since concentrations of chemicals present indoors do not exceed OSHA permissible standards, indoor levels are safe and the health complaints of occupants results from hysteria, neurosis and/or hypochondria. The fallacy in this statement should be obvious.

To emphasize the potential synergistic and/or additive effects of indoor chemicals, we investigated an incidence of building-related illness. The study involved examining for the presence of antibodies to three indoor chemicals (formaldehyde, toluene diisocyanate and trimellitic anhydride) in 14 symptomatic adults. The twelve subjects, who were tested, had antibodies against one or more of the chemicals. Several of the 12 individuals had antibodies to all three chemicals. It was apparent from these observations that the human immune system can simultaneously respond to more than one airborne sensitizing chemical. The indoor concentrations of the three chemicals were below recommended OSHA standards. These subjects formed the basis of the scientific paper recently published in the Amer J Indus med. (1989) 15 187-195.

Over the past three years we have studied the biological effects of indoor air pollution with low level formaldehyde concentrations in over 300 individuals. These studies were clinical not epidemiological studies and were performed in response to physicians ordering the tests because of the patients symptomatic complaints. These symptoms were similar irrespective of the patients area of domicile. We have studied patients from Alaska to California to Florida to New York. The symptoms

complained by these patients are listed as follows.

THE SYMPTOMS OF CHRONIC INHALATION OF FORMALDEHYDE

Flulike Illness: Individuals who develop permanent health problems associated with formaldehyde exposure have had a "flu-like (coldlike) illness" sometime during the exposure. The illness is usually diagnosed as a viral infection and treated accordingly. However, the affected individual does not completely recover from the bout with this flu. Thereafter, a condition of general malaise, fatigue, depression and multiple organ health complaints occurs.

Skin: An itchy dry skin without a rash has been described by some patients. Others may experience a rash on protected (trunk) and unprotected (arms, face) regions of the body. The most common skin lesions resemble acute contact dermatitis or eczema, but other skin lesions may occur (see Chapter 8).

Eyes: Eye irritation occurs. Over the counter eye drops as well as prescribed medicine give limited relief. Contact lenses can not be worn in the contaminated environment. Crusting of eyes upon awakening, conjunctivitis and corneal erosion have been observed in the severely affected. Healing following eye surgery (e.g. cataract lens replacement) is poor. Blurred vision may also be present without obvious changes in visual acuity tests.

Throat: A dry burning sensation best describes the sore throat, usually in the nasopharyngeal region. Hoarseness with partial laryngeal paralysis (difficulty with speaking) has been observed.

Sinuses: Sinusitis and repeated sinus infections occur. The patient complains of congestion. Sinus examinations are invariably negative. Ethmoid polyps may occur, which may require surgery.

Nasal Cavity: Nasal congestion is usually present. Over the counter decongestants are of little value. We have seen diagnosis of allergic and chemical rhinitis. Epistaxis (nose bleeds) may occur. A Post nasal drip may be present. Diagnostic tests for nasal ciliary action may reveal impaired ciliary function.

Sneezing, Wheezing and Coughing: Some individuals have complained of sneezing jags, i.e. repetitive uncontrollable sneezes. Wheezing with shortness of breath can occur. The wheezing and shortness of breath are aggravated in those with pulmonary disease (e.g. asthma, emphysema, pulmonary fibrosis). Initially coughing may be productive (phlegm). After a period of time the coughing usually becomes unproductive.

Lungs: Individuals with a history of lung disease, (e.g. asthma, fibrosis, pneumonia, T.B., emphysema) are most adversely affected, along with the very young and the elderly. In California we have observed elderly mobile home dwellers with lung disease (usually emphysema) increase their need for oxygen therapy while at home. When away for a period of time, e.g. vacation, the need for oxygen decreases.

Pulmonary diagnoses for individuals with severely affected lung conditions have included the following: bronchitis, tracheobronchitis, adult onset (intrinsic) asthma, hyperactive airway disease, and hypersensitive pneumonitis. Also, some individuals have had repeated lung infections with hospitalization for pneumonia. Respirometry tests may reveal the presence of mild restrictive small airway disease.

Cardio-vascular: chest pains, chest tightness and heart palpitations may be present. It is of interest to note that individuals complaining of cardiac palpitations have had a history of mitral valve prolapse. Their chief complaint is that of more severe episodes of arrhythmias.

Skeleto-Musculature System: Muscle spasm and muscle cramping, particularly of the legs, lower back and shoulder-neck area, may occur. Joint pains, aches and swelling have been observed. Diagnostic tests for rheumatoid factor are usually either negative or borderline.

Peripheral Neuropathy: Some patients have complained of a tingling (numb) sensation of the forearms and finger tips.

Gastro-intestinal (G.I.) Tract: Gastritis (upset stomach) and nausea are very common health complaints. Loss of appetite may occur. Periods of unexplained diarrhea alternating with constipation is a very frequent complaint. The episodes of diarrhea are accompanied with lower bowel cramping. Individuals with G.I. tract involvement will usually have autoantibodies directed against the parietal cells of the stomach and less often smooth muscle.

Genito-Urinary Tract: Frequency of urination with pain plus kidney pain have been described. Females of reproductive age may have chronic vaginitis and dysmenorrhea. Males have complained of testicular pain.

Central Nervous System: Severe headaches are usually present. Over-the-counter remedies give little relief. Dizziness or vertigo are common complaints. The dizziness is not a true vertigo, but is best described as a disorientation or "spacey" feeling. Individuals often complain of changes in higher cognitive functions. Loss of memory, inability to recall words and names, difficulty with current tasks and depression are the most frequent CNS complaints. During the course of a conversation, affected individuals often cannot recall the

earlier portions of the discussion and will grope for common words and names. Usually psychiatric examinations will be negative. However, neuropsychological testing will reveal either discrete or borderline deficits in the above cognitive functions.

The problems surrounding psychiatric examinations for these CNS changes are emphasized in the following case situation. The health records of an adult male applying for disability as a result of work-related injuries from formaldehyde exposure showed six different diagnoses following six different psychiatric examinations. Five psychiatrists reported Freudian findings, while the one neuropsychologist observed decrements in the psychometric test scores for cognitive functions.

Special Senses: Unusual changes occur in the special senses as follows:

Hearing: Individuals have complained of ringing (tinnitus) in the ears, which was not present prior to exposure. Also, cacophony (noise) is bothersome, where it used to be acceptable.

Taste: An alteration in the sense of taste may occur. The most common complaint has been a metallic taste, similar to that following a visitation to the dentist.

Smell: A few patients have described either a decrement or a complete loss in the ability to detect odors. However, the vast majority of patients described an increased awareness and sensitivity to odors, often their sensitivity results in an unpleasant reaction to the odor (cacostmia). Recently Ryan and others described patients exposed to organic solvents in a work situation who complained of cacostmia (Christopher M Ryan et al *Am J Psychiatry* 145 1442-1445). These subjects are overly sensitive to common odors (e.g. new carpets, tobacco smoke, diesel exhaust, perfumes, detergents, fabric softeners, fresh paints, new clothing, etc.). Often these odors precipitate shortness of breath and CNS symptoms.

General Physical Status: Affected individuals complain of general malaise and fatigue. Normal every day chores, e.g. yard work, house work, mild exercise, which used to be done with vigor, are difficult to accomplish. The following statements are often made: "I just feel tired all of the time and I don't seem to be able to get enough sleep." "I come home from work and immediately take a nap." "I go away for a while (vacation, long week-end), get to feeling good, return and become ill again." We have seen individuals hospitalized, get well during the hospital stay, return home or to work and become ill again. Also, patients who have taken a leave of absence from work get to feeling better, only to become ill upon returning to the office.

The tests commonly ordered on these patients are as follows:

Antibodies to Formaldehyde:

This is an ELISA procedure performed to detect Human IgG, IgM, IgE, to a conjugate of formaldehyde to human serum albumin. The ELISA procedure is a well recognized method for detecting and quantifying antibodies against specific antigens, eg it is the procedure approved by the FDA for detecting antibodies to the Human Immunodeficiency Virus. The specific test is described in Comments on Toxicology 1988 2. 155-174.

Lymphocyte Surface Markers:

This technique uses monoclonal antibodies available from Becton Dickerson and Coulter Immunology. These antibodies are widely available and in routine use in clinical medicine. Surface markers are used to diagnose such diseases as leukemia and AIDS.

Autoantibodies:

Antibodies produced against the tissues of the patient are detected using an immunofluorescence technique. The target tissues used are stomach, liver, and kidney from the rat (ideally one would like to use human tissue but this is not practical). The antibodies looked for react with certain cells or parts of cells and include the parietal cells from the stomach, the mitochondria from the liver cells and smooth muscle also form the liver. These are detected in autoimmune disease such as Systemic Lupus, autoimmune gastritis, and biliary cirrhosis.

Interleukin 1 Generation:

This is a procedure used to detect the status of the macrophages, these cells are the initiators of the immune reaction, and as such are pivotal in the study of these disorders. Pharmacologically interleukin 1 reproduces some of the symptoms of 'flu, and therefore is an excellent mediator for some of the symptoms manifested by these patients. The procedure used in this test are also widely used but for different purposes and I consider this procedure somewhat experimental.

Expected Values:

Before a procedure is put into routine clinical practise as a measurement by a clinical laboratory it must be validated with normal individuals ie expected values. In my laboratory this was done by using volunteers who were apparently normal, the group consisted of males and females age ranges from 18-55, they were laboratory personnel or students at local colleges. A total of 68 were examined starting in 1985 with 12, laboratory workers, then in 1986 18 students, followed in early 1988 with 10 physicians and finally in the summer of 1988 28 students were studied. Smoking history was not obtained from these volunteers.

The data obtained from these studies were statistically analyzed and used as expected values on the patient report form and as control data in the subsequent publications, which are attached to this testimony.

Results:

The results of these studies are as follows, Table 1 taken from Broughton, A. and Thrasher JD, 1988. Comments on Toxicology 2 55-73. shows that IgG antibodies to Formaldehyde were seen in 41 out of 45 and IgM antibodies were seen in 15 out of 45 and IgE antibodies in 20 out of 45 patients. Indicating that in these patients who had symptoms and also had documented low level (less than 1.0ppm) exposure to formaldehyde produced antibodies.

Our conclusions are that the production of antibodies is an index of exposure and an immune response.

The effect of smoking on antibody levels has not been formally studied as yet ; however we have the following comments.

1) On average an individual is indoors 90% of the time. This includes car driving, shopping etc. For example a retired or non working person living in a mobile home will spend approximately 186 hrs a week in that house; an office worker will spend about 40 hrs a week in a building but a one pack a day cigarette smoker will be exposed only for 11.5 hrs assuming 5 mins to smoke a cigarette. His exposure will be approximately 1.0 mg per cigarette for formaldehyde.

2) We have the smoking history of some of the patients at Boeing, and initial analysis shows the following, 47.2% of the smokers had at least one antibody to formaldehyde, and 48.2% of the non smokers also had at least one antibody to formaldehyde. Interestingly 40% of the ones who had quit showed similar results. Even without statistics it appears that smokers did not play a major role in the production of antibodies in this group. These patients again were referred by clinicians and were part of an epidemiological study.

Lymphocyte Surface Markers:

Of all the surface markers studied, a marker called Tal, first described in active multiple sclerosis patients, has provided the most significant data. Table 2 from a paper recently submitted by Broughton and Thrasher to a peer reviewed journal shows the results of these studies again on patients but statistically compared to 27 students. The results shows that mobile home, office workers and occupationally (anatomists, pathologists, and medical students.) individuals have a highly statistically significant increase in the presence of the Tal marker. The patients removed from the exposure also have a statistically significant increase but less than the other groups.

This lymphocyte marker has been implicated in immunological memory and is also increased in newly diagnosed type 1 diabetes, autoimmune thyroiditis as well as active multiple sclerosis. Thus it is likely that this is an activation

marker.

Autoimmunity:

Table 3 shows the results of the autoantibody studies expressed as the percentage positive as compared to the controls. These patients all have significant increases of autoantibody production over the controls.

Conclusions:

There is no doubt in our mind that low level exposure to chemicals such as formaldehyde causes human illness. This illness is debilitating and often the patients complain of an inability to exist in modern society. For example the cacosmia described above extends to perfumes, colognes, etc which many of us regard as very pleasant smells. Their pleas are often ignored by their family physicians, who often label them hysterics, psychosomatics, panic reactions or stress related diseases.

Indeed these patients often have major psychological problems and indeed some of them have no discernable physical problems. However we feel that the demonstration of low titer antibodies to formaldehyde, high T_H1 positive cells, and the presence of autoantibodies indicates an abnormal reaction to formaldehyde exposure in the indoor air.

At this time we have not been able to analyze the vast amount of data that has been generated from the studies of the patients at Boeing.

Recommendations:

Education: In a recent report the National Research Council (1988); "The role of the primary care physician in occupational and environmental medicine" states that widespread exposure to environmental hazards is present, a substantial amount of illness, injury, and death is contributed to or affected by occupational and environmental conditions. Expertise is nominal in medical schools and practically non-existent in primary care physicians for example only 50% of US medical schools have reported even a single faculty member in occupational health.

Bernard D. Goldstein Professor and chairman Department of Environmental and Community medicine at the Robert Wood Johnson Medical School in New Jersey states that "the amount of funding from government for research in environmental health is so small that it precludes the development of faculty strength. Which also perpetuates the lack of knowledge in the primary care physician.

Disease Definition: The National Academy of Sciences estimate that at least 15% of the U.S. population are affected by the indoor air, both the EPA and the WHO estimate that 30% of the office buildings in the US and the world fit into the sick building category. Disease recognition is hampered by bigoted practicing physicians on both sides of this issue.

Must we be reactive as in 1976 with the outbreak at the Bellevue in Philadelphia or can we for once be proactive to prevent similar events.

Table 1 This table summarizes the titers of IgG, IgM and IgE antibodies to F-HSA in 45 individuals exposed to indoor formaldehyde. Although the total of patients in each column with positive titers (1:8 or greater) does not equal the total number of patients, 100 % of subjects had positive titers.

Source of Exposure	Number of Patients	IgG Titers (No.)	IgM Titers (No.)	IgE Titers (No.)
Occupational	5	1:16-1:64 (5)	1:4 (1) 1:16-1:64 (2) ND (2)	1:4 (3) 1:8-1:256(2)
Automobile	3	1:32-1:64 (3)	1:4 (1) ND (2)	1:4 (1) 1:32(2)
Mobile homes	8	1:4 (1) 1:16-1:64 (7)	1:4 (2) 1:8-1:64 (3) ND (3)	1:4 (4) 1:8-1:64(4)
UFFI homes	6	1:4 (2) 1:8-1:32 (4)	1:4 (2) 1:8-1:32 (4)	1:4 (5) 1:8 (1)
Paneling	3	1:8-1:16 (3)	ND (3)	1:4 (1) 1:8-1:16 (2)
Particle-board	6	1:8-1:64 (6)	1:8-1:32 (6)	1:4 (6)
Office Building	14	1:4 (1) 1:8-1:256 (13)	ND (14)	1:4 (5) 1:8-1:32 (9)
Totals	45	41 positive	15 positive	20 positive

ND = not done because IgM assay was not available at the time of tests.

Expected Titers = 0.00 to 1:4

These data comprise the initial 45 patients tested for antibodies to F-SA. The Table is from Broughton and Thrasher, 1988. Since compiling this table an additional 100 individuals have been tested with similar results.

Table 3. This table summarizes the absolute numbers, the percentages, and t and p values obtained for Tal, IL2⁺ and LEU10⁺ cells in the five groups. The expected reference ranges are also included. Absolute numbers (ABS) are in cells/mm³ of blood.

Students $n = 27$		Mobile Homes $n = 19$		Office Workers $n = 21$		Occupational $n = 7$		Removed $n = 21$	
ABS	%	ABS	%	ABS	%	ABS	%	ABS	%
Tal	122 ± 91 5.1 ± 3.6	463 ± 306 19.7 ± 15.1	3.95 (<0.001)	447 ± 509 15 ± 12	3.57 (<0.001)	536 ± 334 21 ± 11	3.78 (<0.001)	236 ± 205 9.9 ± 8.1	2.53 (<0.01)
IL2	71 ± 45 3.3 ± 2.7	171 ± 151 6.2 ± 5.2	2.15 (<0.025)	150 ± 122 4.4 ± 3.8	1.02 (N.S.)	102 ± 87 3.4 ± 2.2	0.102 (N.S.)	139 ± 113 6.9 ± 6.1	2.52 (<0.01)
LEU10	143 ± 103 6.2 ± 4.6	245 ± 280 8.7 ± 7.5	1.3 (N.S.)	280 ± 191 11 ± 7.9	2.7 (<0.01)	286 ± 282 8.9 ± 4.7	1.36 (N.S.)	310 ± 344 13 ± 9.6	2.95 (<0.01)

Expected Ranges: Tal (ABS = 0-160 and 0-4 %); IL2⁺ (ABS = 0-320 and 0-8 %);

B (LEU10) cells (ABS = 50 to 400 and 0-15 %).

Table 3. This summarizes the frequency (%) of each autoantibody found in the five groups. In the lower portion of the table, the rate (%) of each group with one, two, three, or four or more autoantibodies is given.

	Students (%)	Mobile Homes (%)	Office Workers (%)	Removed ^a (%)	Occupational ^a (%)
	n = 28	n = 19	n = 20	n = 8	n = 3
ASS	14.3	52.6	25	25	33.3
APC	3.6	84.2	60	25	33.3
ABB	7.7	15.8	25	12.5	33.3
AMIT	0	21.1	10	12.5	0
ANA	3.6	10.5	15	0	33.3
1 or More	21.1	89.5	80	50	66.6
2 or More	7.1	58.9	45	25	33.3
3 or More	0	36.8	15	0	33.3
4 or More	0	0	0	0	0

^a = numbers are insufficient to perform an odds risk analysis.

ASS (antismooth muscle); APC (antiparietal cell); ABB (antibrush border); AMIT (antimitochondrial); ANA (antinuclear)

Testimony By
Dale H. Daniels, Executive Vice President
Lockheed Aeronautical Systems Company

March 6, 1989

Before the United States Senate
Subcommittee on Toxic Substances, Environmental
Oversight, Research and Development

Good morning, Mr. Chairman. I am Dale H. Daniels, executive vice president of Lockheed Aeronautical Systems Company (LASC), headquartered in Burbank, California. As a designer and producer of military aircraft, we currently employ 25,500 people at major manufacturing, research and modification facilities in Marietta, Georgia; Burbank and Palmdale, California; and Santa Clarita, California, home of the Kelly Johnson Research and Development Center.

The company currently produces the F-117A "stealth fighter", the C-130 and C-5B transports, the P-3 Orion anti-submarine warfare aircraft, and the TR-1 tactical reconnaissance aircraft. In addition, Lockheed leads a three company team that was awarded one of two \$691 million contracts to design, manufacture and flight test prototypes for the Advanced Tactical Fighter competition now being conducted by the United States Air Force. Last Fall, the Navy selected Lockheed to develop the nation's next generation maritime patrol aircraft, the Long-Range Air Anti-submarine Warfare Capable Aircraft (LRAACA).

My mission this morning is threefold. First, I hope to add to the Committee's body of knowledge on the use of composite materials in aircraft manufacturing. Comments reported in the news media in recent months have cast an aura of mystery over the use of these materials.

Second, I want to convey to the Committee our deep sense of commitment to the health and safety of our employees. Throughout our 60-year history we have strived to provide a hazard-free

workplace. In recent times, as manufacturing processes have become more complex, we have responded with both talent and money. Our environmental protection and safety organization in Burbank, for example, is comprised of more than 50 professionals and is headed by a toxicologist. In 1988 alone we invested several million dollars at Burbank in employee training, new plant and equipment, protective gear, and environmental protection equipment and operation.

We know that proper training, the use of proper protective equipment, and the application of engineering controls offset hazards. That is why we take elaborate measures to address this issue.

The Occupational Safety and Health Administration (OSHA) recently completed an intense four-month inspection of our plants in Burbank, focused principally in classified manufacturing facilities. Having received complete and unrestricted access to all of our facilities, OSHA advised us that we will receive a variety of citations pertaining to health, safety and recordkeeping.

Third and finally, I hope the Committee will conclude its deliberations with an understanding that technological and scientific change is occurring at a rapid pace. It is important that government and industry cooperate to ensure a safe and healthy working environment.

I would now like to address some comments to our operation at Burbank, where we have approximately 15,000 employees.

I. Use of Composites at Lockheed

What is a composite?

Composites are defined as "two or more materials combined to form a useful third material." Lockheed has been using composites since the 1920s when it made its first laminated plywood parts for aircraft manufacture. Chemical composites were discovered in the late 1930s and early 1940s during research for synthetic rubber.

Since then, composites have become a part of modern manufacturing. They are used extensively in the manufacture of automobiles, electronic components, sporting goods (graphite shafts for golf clubs, for example), construction material (fiberglass), and airplanes.

Some state that composites are an important link in U.S. industrial competitiveness. And we agree. In aerospace, particularly, composite development is occurring in response to the need for lighter, more durable, and less costly materials. Such factors underpin the development of the nation's next generation advanced tactical fighter. In fact, about half of the structural weight of this combat aircraft will consist of composite materials.

So important are these material advances that Lockheed recently invested in the construction of its own Composite Development Center. Here, under strict laboratory conditions, we

are capable of exploring the properties of new non-metallic materials that offer the potential for improving the performance of modern aircraft. We look upon this facility as a key element in the design and development of aerospace products capable of withstanding the requirements of modern aviation. "Stealth," for example, is largely the result of the application of composites which provide high levels of radar resistance without sacrificing structural integrity or cost.

Composite technology is evolving so rapidly that there is a need for additional toxicity information on composites to make human health assessments.

I should add that we are also in close contact with our unions on these matters. The International Association of Machinists and our other unions are working with us to ensure a safe and healthy workplace for our employees.

I think it is important to note that the raw materials being used in aerospace -- resins, catalysts, solvents, fabrics, fibers, inorganic ceramics, metal-containing pigments, and preimpregnated fabrics -- are also in common use throughout U.S. industry. Moreover, the use of these raw materials is not affected by the classification of the program. In other words, many materials used in so-called "black" or classified military aircraft programs do not differ from those being used in "white" world or unclassified programs.

II. The Company's Compliance with Safety and Health Regulations

(1) Professional Organization

Lockheed's policy is to provide a safe and healthful work environment for all employees and to comply fully with occupational safety and health regulations. In this regard LASC-B (the company's operation at Burbank) has a team of safety and health professionals.

In 1987 LASC-B made a decision to consolidate the company's health protection organizations into a new unified and expanded organization called the Environmental Protection and Safety Branch. The branch professionals include industrial hygienists, safety engineers, an epidemiologist and a toxicologist. This organization reports directly to me.

The branch is the most visible element in Lockheed's re-examination of operational structure and programs with regard to health and safety issues. The company conducts ongoing reviews of existing health and safety systems, training programs and workplace conditions.

As a result we have taken the following important steps: 1) We hired an epidemiologist to develop systems that will allow Lockheed to identify, evaluate, and track possible clusters of workplace related illness, 2) reviewed and revised the medical surveillance and physical examination systems, 3) reviewed and revised the criteria and guidelines for use of personal protective equipment, 4) constructed a new Advanced Composite

Facility, 5) incorporated the health and safety training function into the branch, with an ongoing review and revision of the training program, 6) reviewed and revised engineering controls, including installation of new ventilation systems as appropriate, 7) made improvements in communications between supervisors and workers, 8) made changes in solvent wipe processes that reduce exposure to solvent vapors, and 9) made changes in autoclave wait-time processes that significantly reduce exposure to fumes and off-gassing when autoclaves are opened.

(2) Communication Between Supervisors and Production Employees

Communication between management and production employees is a prerequisite for an effective safety and health program. Health and safety communication employs a variety of methods:

Regular Safety Meetings:

- . General Safety Committee: This is the highest formal committee involving Union safety representatives and company officials. It meets monthly to resolve safety problems and to recommend policy.
- . The Departmental Safety Committee: Line management meets with departmental employees on a monthly basis to discuss specific health and safety issues and to provide appropriate guidance and training.
- . Workers' Safety Committee: Employees chosen by the

unions are afforded time for comprehensive walk-around inspections of their work areas. Discrepancies are written in formal minutes, distributed and tracked until resolved.

- . "Safety" Trouble Call System: Lockheed maintains a safety trouble call system. Any employee may call to report a potential safety problem. Response to these items is assigned to the maintenance staff.
- . "Safety" Facilities Request Forms: Those items that cannot be handled through the Trouble Call System are handled through written requests to the Maintenance Department.
- . Direct Employee Communication with Health & Safety: Employees and supervisors can seek answers to safety and health questions by calling the Health & Safety organization directly. This organization is staffed to respond appropriately to employee requests, including standards clarification, complaints, and requests for surveys of workplace exposures.
- . Regular Training Classes: Training in safety and health is required for employees and supervisors. Topics include roles, responsibilities, hazards recognition, and means of protection.
- . Certified Training for Hazardous Occupations: Lockheed has designated some job tasks as hazardous. Employees are required to become certified before they can work at these tasks. Some certification can be accomplished through

classroom training. Other types require the successful completion of a medical examination as well. Examples of the latter include all individuals who use respirators in their work and all those working in our foundry.

(3) Interaction Between Company Organizations

Lockheed requires active communication and interaction between Health & Safety and other key departments:

Medical Department: The Health & Safety Department determines which workplace exposures require medical assessment, and directs the Medical Department to develop appropriate medical monitoring programs. Employee medical monitoring programs are provided for employees who work with materials such as paints, solvents, cleaning fluids, dusts (including fiberglass, ceramic, paper, and wood), resins/epoxies, welding fumes, asbestos, beryllium, gases, and metals.

The Medical Department maintains records of injuries and illnesses that its staff treats. Using a protocol established by the Environmental Protection and Safety Branch, occupationally-related illnesses and injuries are reported to Health and Safety. These reports are entered into a computerized log of reportable illnesses and injuries. This log is used for required reporting to OSHA. The company's

epidemiologist reviews the log, looking for patterns of illness and injury that may identify workplace risks. The epidemiologist and industrial hygiene and safety professionals inspect these workplace settings and where appropriate they design intervention programs to reduce risk of occupationally-related illness and injury.

Training and Hazard Communication: The Health and Safety Department conducts the hazard communication training that is required by OSHA regulations. Lockheed has identified certain tasks and environmental conditions related to employment as requiring special employee training and/or certification. Documented Safety Training Certification Program (CERTS) provides this training. Examples of required CERTS training include training for mixing of epoxies and other resins.

Labor Relations: In consultation with Health & Safety, the company's Labor Relations office has formalized and published supervisory guidelines.

III. Use of Composites and Related Chemicals

(1) Raw Materials

In aerospace, three general types of composites are used: 1) fiber composites, in which fibers are imbedded in some type of a carrier system (usually a resin system), 2) laminate composites, in which layers of various materials are bound together by a "glue" (plywood is a good example), and 3) laminated fiber reinforced composites (combinations of fiber composites and laminate composites). Composites are used in aerospace because of their significant weight savings, high resistance to fatigue damage, minimal material scrappage, reduced machining requirements, easy accomplishment of tapered sections and compound contours, and because of the reduction in the number of assemblies and fastener (rivet) count.

Raw materials used in aerospace composites include resins and catalysts, solvents, fabrics, fibers, inorganic ceramics and metal-containing pigments, and preimpregnated fabrics. None are unique to aerospace. Asbestos, previously used because of its high heat tolerance, is no longer used in the construction of new aircraft at Lockheed. Other substances that are used in aircraft manufacture in general are also used, including coolants, cutting oils, cleaning agents, and other lubricants.

(2) Industrial Processes

The majority of industrial processes used in the manufacture of composite aircraft parts are the same as those that are used in the manufacture of metallic aircraft parts. For instance, parts must be finished once they have been shaped. Finishing requires machining, cutting, drilling, and grinding. Cleaning parts involve the use of various solvents. Abrasive blasting using sand or plastic media prepares surfaces for additional processing such as painting. Painting provides corrosion control and a finished appearance.

The processes that are unique to composites are those that deal with making the mixture that will be used to produce the composite part, molding the mixture into the shape of the part, and curing. When composites are made "from scratch", resins are mixed from raw materials and catalysts. Reinforcement (fibers or fabric) is added and the resulting mixture is applied to molds using a spray system or by hand lay-up. Today composite parts are often made from preimpregnated fabrics, tapes, or mats. These are provided by manufacturers in long rolls (much like a roll of carpet) which are rolled out and cut on long tables. They contain all ingredients necessary to make a composite part: fibers, resins, catalysts, and curing agents. Other industrial processes include layup (where the composite material is placed over a mold or tool; preimpregnated materials may be layered as well) and curing (where the chemical processes involved in making

the new third material are carried out). The curing process is specific to the particular part and its components, it is usually accomplished either at room temperature or at elevated temperatures. The part to be cured is often placed in a vacuum bag and heated in an autoclave. Once cured, the part is finished using routine trimming, sanding, machining, and drilling techniques. Finished parts are assembled into the desired structure. Coatings and painting occur at several stages in the process. The finished structure then undergoes functional checks of hydraulic, fuel, and electrical systems.

(3) Potential Adverse Health Effects

Adverse health effects may occur following exposure to certain raw materials and processes. These potential adverse health effects are not unique to the aerospace industry. Composite-related exposures are most likely to occur through inhalation of dust, vapors, or fumes or when substances are absorbed through or react with the skin. Potential effects of the raw materials include skin, eye, and respiratory irritation and allergy, chronic lung disease, adverse reproductive effects, central nervous system depression, and damage to liver, kidneys, bone marrow, blood forming systems and lymphatic systems.

Exposure to non-asbestos fibers can lead to scarring of the lungs. Some of these fibers have been found to cause cancer in laboratory animals. Two chemicals used as curing agents,

methylene dianiline (MDA) and sulfonyl dianiline have been shown to cause cancer in laboratory animals (the danger to human beings is still unclear). MDA is a known liver toxicant and some of the glycol ethers adversely affect reproduction. Heavy metals, including chromium VI (a carcinogen) and silver, are important constituents of pigments. Exposure to heavy metals may occur in a variety of ways that are unique to each pigment and process and may result in such varied health effects as cancer, gastrointestinal disorders, and damage to the nervous system.

Additional health risks are posed if the raw materials are explosive or flammable. Improper mixing of epoxy resins from their component parts can create exotherms (forms of combustion) that may create heavy smoke. This smoke is filled with hazardous compounds. Workers can be burned if they come into contact with hot surfaces. When workers are cutting preimpregnated materials or are trimming, sanding, grinding and drilling parts they can be cut or they can suffer serious scrapes or bruises. These activities also create potential nuisance dust exposures.

(4) Potential Adverse Psychological Effects

There is also the potential for adverse psychological effects on employees, even in the absence of medical evidence of adverse physical health effects. Working with unfamiliar substances may contribute to employee stress.

(5) Controls

Most composite-related exposures occur when people are breathing contaminated air or when they get chemicals on their skin. A combination of engineering and work practice controls together can significantly decrease the risk of exposure.

Lockheed employs two primary engineering work place methods to control exposures: containment or isolation of materials, and ventilation. Storage of hazardous materials and hazardous wastes is limited to certain enclosed storage areas. Some processes are conducted in rooms or areas that are isolated and that can be closed off in the case of accidental leaks or if environmental levels of chemical contamination get too high. Ventilation includes local exhaust systems that pull fumes, dusts, vapors or other contaminants away from the worker. In some cases isolation and ventilation systems are combined to produce protective areas for work, such as enclosed work hoods, paint booths, and clean rooms with specialized ventilation systems. Other more common industrial control techniques include machine guards and cutters that will not cut skin, confined space monitors and emergency release mechanisms.

Where engineering controls cannot provide adequate protection, Lockheed employs work practice controls. These include analysis of job hazards, environmental monitoring, good hygiene and housekeeping practices, use of protective equipment, medical surveillance of workers, and emergency preparedness.

Job hazard analysis is conducted by our Health & Safety staff. The analysis consists of a review of raw materials, processes, and workplace conditions including current exposures and ventilation. Environmental monitoring of the work area includes measurements of air contaminants. Other potential exposures, such as skin absorption or back strain, are also evaluated. Results of the analysis are used to establish medical monitoring programs, ventilation requirements, workplace practices, both general and special housekeeping and hygiene requirements, and personal protective equipment requirements.

Personal protective equipment must be employed where worker exposures cannot be controlled by engineering methods. In composites work, the most common types of personal protective equipment are respirators, gloves, body coverings, and eye protection. Precise respirator requirements are dictated by the nature of the workplace exposures. These range from dust masks that reduce nuisance dust exposures to full supplied air systems. Gloves, arm sleeves, aprons, hair coverings, and coveralls are used to protect workers from absorbing hazardous chemicals through their skin. They must also be carefully chosen to match the task so that they are truly protective to the worker.

Lockheed's Medical Department offers specialized medical examination and medical surveillance programs. Each is designed to evaluate the health status of workers who are exposed to potential health hazards in the workplace. Employees who are designated as working in hazardous areas are assigned to a

specific medical monitoring program. They are medically evaluated before they begin to work in that area and on a regular (usually annual) basis thereafter. When employees in hazardous job classifications do not meet stringent medical requirements they are removed from that job until their medical test results return to normal.

Emergency preparedness is a basic necessity for worker health and safety and for environmental protection. Lockheed has a detailed emergency response plan that includes information on where all chemicals and other hazardous materials are stored and how both workers and work areas are to be treated in case of emergencies. The Environmental Protection and Safety Branch works closely with the company Fire Department in the area of emergency preparedness.

Lockheed recognizes that raw materials and processes in the workplace pose potential health threats to employees. However, when employees are properly trained and utilize the proper protective equipment, together with adequate engineering controls, the employees can work safely.

IV. Claims and Lawsuits
Workers Compensation Claims

Lockheed has 288 workers compensation claims pending which allege exposure to toxic substances other than asbestos. 113 of these claims allege serious and willful misconduct by Lockheed, and the company has denied these allegations. Set forth below is a synopsis by year of chemical claims:

	Claims <u>Filed</u>	Claims <u>Open</u>	Claims <u>Closed</u>
1985	30	8	22
1986	75	55	20
1987	87	72	15
1988	104	97	7
1989	<u>56</u>	<u>56</u>	<u> </u>
Total	352	288	64

(continued)

Of the 288 pending chemical claims, 236 were filed by the same applicant's counsel. These filings occurred as follows:

1985	2
1986	64
1987	65
1988	69
1989	<u>36</u>
Total	236

Lockheed also has 15 workers compensation claims pending which allege exposure to asbestos. Set forth below is a synopsis by year of asbestos claims.

	Claims <u>Filed</u>	Claims <u>Open</u>	Claims <u>Closed</u>
1985	13	1	12
1986	11	6	5
1987	4	2	2
1988	5	5	
1989	<u>1</u>	<u>1</u>	<u> </u>
Total	34	15	19

The pending chemical and asbestos claims are currently in the workers compensation process, which includes medical

evaluations by an applicant's physician and a company selected physician. Of the 236 filings, five have gone to hearing before the California Workers Compensation Appeals Board. There has been one finding and award and it is currently under appeal by Lockheed.

Litigation

There are eight lawsuits filed in court by current or former employees who allege chemical exposure. The eight lawsuits have a total of 88 plaintiffs. Two additional lawsuits have been filed by two non-Lockheed employees alleging chemical exposure. These two lawsuits have a total of two plaintiffs. Of the 10 lawsuits, five have been served on Lockheed. The lawsuits also name numerous codefendants who are chemical manufacturers.

The actions allege fraudulent concealment, products liability, breach of warranty and negligence regarding alleged exposure to chemicals in the workplace. The plaintiffs seek general and special damages for pain and suffering, past and future medical expenses, interest, punitive damages, costs of suit and such other relief as the court may deem proper. In the five actions served, Lockheed filed Answers which deny the allegations, set forth affirmative defenses, and request that the actions be dismissed with prejudice. In the Answers Lockheed also requests that it be awarded costs and attorneys' fees and such other relief as the court may deem proper.

Five of the 10 lawsuits were filed in 1986, one in 1987, three in 1988, and one in 1989. The cases which have been served are currently in the early stages of the litigation process.

In addition to the 10 chemical lawsuits, one lawsuit has been filed by a former employee who alleges asbestos exposure. This action was filed in 1986.

None of the lawsuits has yet been tried.

V. Environment at Lockheed

Industrial hygiene and industrial safety requirements are designed to recognize, evaluate, and control environmental factors and stresses that can lead to occupationally-induced illness. The goal of these efforts is the attainment and maintenance of a safe and healthy working environment. This work is conducted by professional industrial hygienists and by industrial safety experts. Industrial hygienists focus on chemical, physical, and biological agents and ergonomic hazards in the workplace. Industrial safety engineers focus on hazards in the general work environment.

In the aerospace industry, many chemicals are used. For example, over 18,000 separate chemicals are used at LASC-B. Material Safety Data Sheets (MSDSs) are required for all of the chemicals and must be prepared by the manufacturers of the chemicals.

Chemical exposures may occur when workers inhale, swallow,

or absorb chemicals through the skin. The chemicals may be present in many forms, both in their pure states and as parts of other products or compounds. Chemicals may be combined to make other compounds during the manufacturing cycle. Chemicals may be present in the working environment as mists, vapors, gasses, fumes, liquids, solids, and in dusts. Physical agents include noise, heat and cold, ionizing and non-ionizing radiation, and vibration. Ergonomic hazards may occur when physical movements must be carried out in ways that adversely affect people's muscles and bones; these include improper lifting, repeated motions, and poor visual conditions. To ensure a safe work environment, safety engineers focus on general workplace conditions, such as safe use of electricity, machine guards, safe work surfaces, ventilation, and general housekeeping.

Safety and health hazards are controlled in one or more of the following ways: education and training, written hazard communication and labeling, routine reporting of injuries and illness, medical surveillance of workers, personal protective equipment, engineering controls, and routine monitoring and inspection. In industrial settings, many control measures are required to produce a safe working environment.

In aerospace, as in most other industries in the United States, there are federal regulations that govern the application of these industrial safety and health principles. Most of these regulations cover the general workplace. Numerous other regulations address specific workplace hazards such as asbestos,

noise, and lead. Most of these regulations are promulgated by OSHA, the federal Occupational Safety and Health Administration, although workplace regulations also appear throughout federal regulations. In California there are additional regulations issued by Cal-OSHA.

VI. Conclusions

In closing, we recognize that environmental health and safety are complex matters. This complexity will not stand in the way of our foremost concern -- the health and safety of our people.

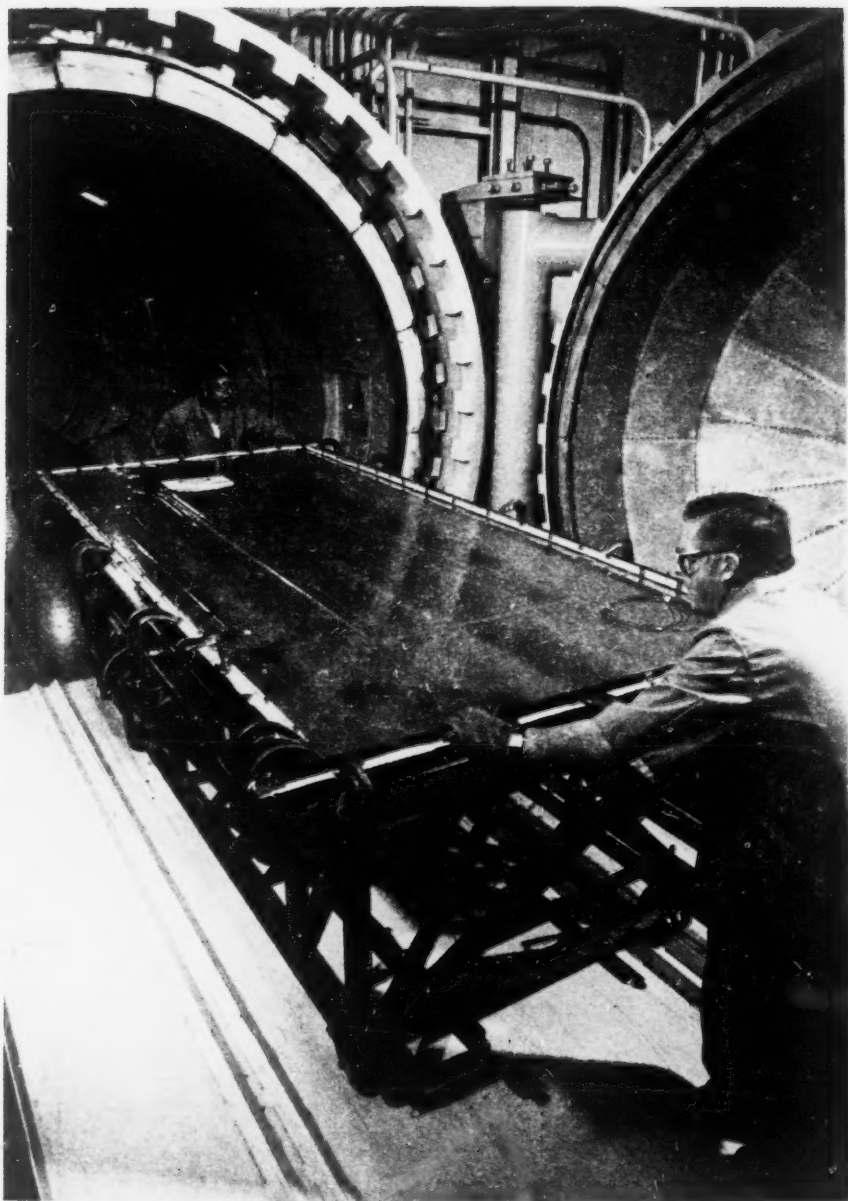
NOTE: Four photographic exhibits follow.



At Lockheed's Composite Development Center in Burbank, Calif., a technician examines rolls of dry fiber on their way to a resin bath. Gloves are not required because the fibers contain no epoxy resins before entering the resin bath, but a respirator is worn for protection against fumes from the bath and any stray fibers in the air.



Sheets of thermoset composite material are layered before being consolidated into one solid piece at Lockheed's Composite Development Center. This lay-up technician wears a shop coat and neoprene-coated latex gloves to protect her skin from epoxy resins contained in the material.



A large, bagged thermoplastic layered panel is wheeled into an autoclave where it will be heated under pressure, causing the composite material to consolidate. Employees wear gloves while transporting the panel to protect them from the sharp metal edges of the holding fixture. This autoclave is one of several at Lockheed's Composite Development Center.



To measure potential chemical and physical hazards of composites and other industrial materials in the workplace, Lockheed health and safety specialists work with a variety of monitoring and detecting devices, some of which are pictured here. Scene is at the company's facilities in Burbank, Calif.

STATEMENT OF JOSEPH F. PERITORE
VICE PRESIDENT
HUMAN RESOURCES

THE BOEING COMPANY

BEFORE THE
SUBCOMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE
REGARDING
TOXIC MATERIALS IN THE AEROSPACE INDUSTRY
MARCH 6, 1989

NOTE: The appendices attached to this statement have been retained in committee files.

Introduction

In August 1987, in response to fire worthiness requirements established by the Federal Aviation Administration (FAA), The Boeing Company began production use of Ferro CPH2284P, a specialized phenolic prepreg, at Building 17-02 of Boeing's fabrication facility in Auburn, Washington. The material replaced a previously used polyester prepreg for the manufacture of interior parts, such as video shrouds, components of ceiling panels, drip shields, and light shields for 747 and 767 aircraft.

The specialized phenolic prepreg contains a phenol-formaldehyde resin system. These resins, which were first used commercially in 1906, are used extensively in such products as electrical connectors, circuit breakers, instrument panels, pot handles, appliance bases, and glues (see Appendix H). They are heat-stable materials with generally very low flammability and smoke/toxic gas emission properties. While processing requirements for older phenolic resins did not make them amenable for making airplane cabin liners, processing improvements allowed use of phenolics beginning in the early 1970's.

Use of the specialized phenolic prepreg in Boeing manufacturing processes was preceded by extensive material testing and evaluation. During this process, Boeing health and safety specialists determined that there would be no unsafe levels of airborne contaminants associated with use of this material. However, because of the potential for skin contact, the use of impervious gloves was made mandatory.

Following introduction of the product into the manufacturing environment, complaints were received from some employees who worked with the material. Many employees visited one non-Boeing physician who diagnosed some, but not all, as having "formaldehyde poisoning." Some employees filed workers' compensation claims.

Boeing continued to perform extensive air monitoring tests during manufacturing use of the material. In addition, the National Institute for Occupational Safety and Health and the Washington State Department of Labor and Industries performed extensive monitoring. Material testing was conducted by the University of Washington which confirmed the accuracy of compositional information reported on the manufacturer's Material Safety Data Sheet. Although all of these tests indicated that there were no adverse employee exposures to airborne contaminants, Boeing initiated several actions and controls, in conjunction with the union, to address the employee concerns. These included:

- Repeated air monitoring to determine the level of employee exposures
- Establishment of an Executive Joint Union/Management Health and Safety Committee to respond to employee concerns

Hiring of outside consultants from the medical and ventilation fields
 Provision of respirators and respirator training for any employees desiring to use them
 Facility modifications
 Additional Hazard Communication training for employees and supervisors
 Initiation of medical and epidemiological evaluations
 Continued Toxicological review of material composition
 Management of medical bills not otherwise compensable under workers' compensation, and voluntary payment of provisional time loss benefits during the period claims are held in abeyance.

Despite a lack of scientific evidence documenting a health or safety problem associated with the use of the specialized phenolic prepreg, Boeing discontinued use of this product at its Auburn facility in December 1988.

Following is a report that provides background information and outlines the events associated with this issue.

Facility Used for Phenolic Resin Operations

Building 17-02 was constructed in 1942 by the Federal Government's General Services Administration as a warehouse. This is a wooden building with a concrete floor, which was used by GSA until 1966, when it was purchased by Boeing and remodeled to accommodate light manufacturing. The 17-02 building contains 160,000 square feet of floor space of which the layup area is 20,000 square feet. (The Fabrication Division's Auburn facility contains approximately 5,000,000 square feet of floor space.)

Approximately 500 employees work in this building (out of approximately 10,000 employees currently located at the Auburn facility, 7,000 of whom are hourly, or manufacturing, employees). The management:employee ratio is 1:22. The ratio of safety monitors to hourly employees is approximately 1:20. Employees in the 17-02 building perform a variety of plastic part manufacturing and sub-assembly operations.

Use of Phenolics at Boeing

In July 1986, the Federal Aviation Administration (FAA) released a regulation which introduced new flammability requirements on parts used as passenger cabin liners on commercial transport aircraft. New aircraft manufactured after 1988 are required to meet the new standards.

As one of the steps to comply with this new rule, in its Auburn manufacturing plant, Boeing replaced a polyester resin that was

used in some affected parts with a specialized phenolic prepreg, Ferro CPH2284P.

When the FAA issued the heat-release rule in July 1986, it specified that affected parts (cabin liners) had to show a total heat release not to exceed 65 kilowatts per minute per square meter (KW-min/M^2) after two minutes of testing, and a peak heat release rate not to exceed 65 KW-min/M^2 during the first five minutes of testing. This has come to be known as the 65/65 rule.

The rule changed Federal Aviation Regulation (FAR) Part 25 to 65/65 immediately (which affected new-design airplanes only), and FAR Part 121 (which affected newly produced airplanes) in two steps. Airplanes manufactured after August 20, 1990 are required to meet the 65/65 definitive standards, and between August 20, 1988 and August 20, 1990 would be required to meet interim standards of 100/100. Parts for airplanes assembled during these time frames must be manufactured months before these dates, however.

In August 1988, the FAA revised the heat-release rule to include smoke emission with 1990 being the effectivity date. Both FAR Part 25 and FAR Part 121 were changed requiring that parts subject to the heat-release rule must also meet certain specific requirements concerning the maximum allowable optical density of smoke generated during a fire.

Material Selection Criteria

Unlike previous rule upgrades, this time the FAA mandated changes for which the supporting technology was neither in place nor readily available. When the heat release rules were promulgated, only a few of the affected components in production actually met the definitive 65/65 standards, which would go into effect in 1990, and some did not meet the interim 100/100 standards. Therefore, it was necessary for airplane manufacturers and materials suppliers to launch intensive programs to develop new materials and/or designs that would meet the new criteria in the relatively short time available. In addition to meeting Boeing health and safety criteria, such new materials and/or designs had to be safe, producible, suitable for the manufacture of parts, and available in sufficient quantities to support production.

The strategy for these programs was to find multiple solutions, if possible, and to proceed in a deliberate and disciplined fashion to select the best solutions within the time frame available.

Part Types

Parts that did not meet 100/100 received first priority. Materials that met 65/65 were used to avoid having to change materials and/or designs twice. Afterwards, attention was refocused to ensure that all parts would meet the definitive

65/65 standards. The types of parts affected by the rule are generally sandwich panels, laminates, and sheets made of thermoformed thermoplastic.

A fiberglass cloth impregnated with polyester resin (prepreg) had been used in laminate applications to fabricate highly contoured parts, like the housing around suspended video projectors. The polyester resin had been used because of problems with the manufacturing characteristics of phenolic prepregs (e.g., evolution of water during cure, and lack of proper form and drape characteristics). However, none of these laminate parts, when fabricated using the polyester prepreg, met the definitive 65/65 standards. While all polyester parts met the interim 100/100 standards, a few were quite marginal. Following evaluation of candidate materials, a specialized phenolic prepreg was selected. This product had appropriate manufacturing characteristics, and it could be used as a substitute for the polyester prepreg, using the same tools to fabricate the parts. All of the parts, when fabricated using this phenolic prepreg, complied with the definitive 1990 standards. This material could therefore be placed into production to achieve a timely implementation of these parts.

Health and Safety Considerations

Before being placed into production, the specialized phenolic prepreg was examined by Boeing safety and health specialists to determine its suitability for use in the factory environment. This evaluation was performed while the product was undergoing performance testing. (Refer to Appendix B for a summary of Boeing's health and safety programs.)

A toxicological evaluation was performed in December 1986 which included review of the manufacturer's Material Safety Data Sheet, and of toxicology data on phenol and formaldehyde, the major components of the material. Air monitoring was performed during preproduction testing. Based on the monitoring data, indicating low airborne concentrations of phenol and formaldehyde, and on the toxicological review, it was concluded that there would be no hazardous inhalation exposure to the material during use. However, because of the potential for skin contact, a requirement was issued to ensure use of impervious gloves during work with the prepreg.

Industrial Hygiene Findings

1. Boeing Industrial Hygiene Surveys

Extensive air monitoring has been conducted by Boeing industrial hygienists, in accordance with regulatory standards, since the phenolic-type resin system was selected in October 1986. Air monitoring was conducted during test layups of candidate materials in January and February 1987. These tests included air monitoring during elevated room temperatures (95°F - 100°F) to mimic worst case conditions that might occur during the summer.

Elevated temperatures would cause more of the phenol and formaldehyde to be off-gassed from the prepreg.

The maximum standards for employee exposure to formaldehyde and phenol are 1 ppm and 5 ppm respectively. Results of the air monitoring during the test layups indicated that formaldehyde levels ranged from <0.25 ppm - <0.45 ppm. Phenol levels ranged from <0.003 ppm - <0.05 ppm. These levels are well within established standards.

Following introduction of the phenolic for production use, air monitoring was conducted from April through July 1988, when numerous complaints were received from employees in Building 17-02, who were working with phenolic prepreg. These shops included the phenolic layup area and the rework area.

Air monitoring was initially conducted in the area where the uncured phenolic material is applied by hand to tools which form the shape of the part being fabricated. Air monitoring was conducted during different shifts and also during heavier manufacturing periods to determine the worst case situation in terms of chemical exposures. All air samples were collected and analyzed in accordance with standard methods established by the National Institute for Occupational Safety and Health.

Results of these surveys indicated that formaldehyde levels ranged from 0.003 ppm - 0.058 ppm. Phenol levels ranged from <0.01 ppm - 0.110 ppm. These levels are well within established standards.

Air monitoring was also conducted in the rework area in Building 17-02 where phenolic parts are surface prepped (sanding and grinding) and patched with phenolic or epoxy patches. Air monitoring was conducted to determine the airborne concentrations of formaldehyde, phenol, and antimony trioxide.

Results of the surveys conducted in the rework area indicated that formaldehyde levels ranged from 0.008 ppm - 0.016 ppm. Phenol levels ranged from <0.006 ppm - 0.02 ppm. Antimony trioxide levels ranged from <0.02 - 0.03 mg/M³. These levels are all well below established standards.

In mid-June 1988, it was decided to provide additional general ventilation to the layup shop in response to continuing employee complaints. To facilitate installation of this system, the layup operation was moved to a temporary location in Building 17-54. Air monitoring was conducted at this location. Formaldehyde levels ranged from 0.008 ppm - 0.046 ppm. Phenol levels ranged from <0.006 ppm - 0.05 ppm. Again, these levels are well below established standards.

2. Washington State Department of Labor and Industries Air Monitoring

In response to employee complaints, industrial hygiene compliance inspectors for the Washington State Department of Labor and Industries conducted surveys on May 25, June 6, 9 and 16, 1988 to determine if chemical exposures associated with the processing of the phenolic material complied with established regulations.

The first two surveys were conducted in the layup area of the 17-02 building during first shift. Personal breathing zone samples were collected during layup operations and analyzed for phenol and formaldehyde. In addition, samples were collected and analyzed for acetone and methylene chloride during the second survey. It was determined by the inspectors that acetone and methylene chloride may be produced by other processes in the same area or adjacent areas. Concentrations of airborne contaminants were determined to be well within regulatory standards.

The final surveys conducted by the state were performed in the rework area of the 17-02 building and the temporary layup area in the 17-54 building. In the rework area, phenol, formaldehyde, antimony trioxide, and total dust levels were measured. Possible air contaminants from other processes in the same area or adjacent work areas were also surveyed. These contaminants included acetone and styrene. At the temporary layup area in the 17-54 building, formaldehyde, amines, n-hexane, acetone, styrene, and methylene chloride were evaluated.

Results of these surveys indicated that concentrations of all air contaminants were well within established standards. No citations or recommendations were issued resulting from any of the state inspections.

Refer to Appendix G for specific monitoring data.

3. The National Institute for Occupational Safety and Health (NIOSH) Study (including air monitoring in the phenolic layup area)

At the union's request, a team of experts from NIOSH made two visits to the site to conduct air monitoring and interview employees who were working with the phenolic materials.

During the first visit, air monitoring was conducted at the layup and rework areas in the 17-02 building and at the temporary layup area in the 17-54 building. Processes monitored in the layup area included part layup, placing and removing parts from curing ovens, and removal of vacuum bags from the parts after curing. Air samples were also collected in the rework area. Layup processes were also monitored in the 17-54 building.

Results of air monitoring from the first site visit indicated that phenol and formaldehyde levels were well within regulatory standards.

A second site visit was conducted by the NIOSH investigators. Additional air monitoring was conducted in the layup and rework areas. In addition, medical questionnaires were given to employees currently in Building 17-02 who transferred during the previous year, to all employees on medical leave, and to employees in the 17-05 building doing layup work involving no exposure to phenol or formaldehyde. Air monitoring for employees was also conducted in the 17-05 building. Preliminary results from air monitoring conducted during the second site visit indicated that phenol and formaldehyde levels were within established standards.

A final report summarizing results of air monitoring and the medical questionnaires has not been issued at this time.

Refer to Appendix G for an initial NIOSH report summarizing air monitoring results and bulk material analysis.

4. University of Washington Analyses of Phenolic Prepreg

a. Thermogravimetric Analysis

Two separate samples of the phenolic material were sent to the Environmental Health Lab at the University of Washington. These samples were subjected to increasing thermal stress up to 700°C and the total amount of volatile material was determined gravimetrically. It was found that the weight loss between ambient and 125°C was between one and five percent. Product weight loss to 700°C was determined to be less than 30 percent which corresponds to the ratio of the thermally degradable to raw fiber portion of the product. The results of this analysis coincide with the manufacturer's information concerning volatile components of the phenolic prepreg, and support industrial hygiene findings of low airborne concentrations. Refer to Appendix G for detailed analytical results.

b. Gas Chromatographic/Mass Spectrophotometric (GC/MS) Analysis for Volatile Components

Vapors from samples at ambient as well as elevated temperatures were trapped and analyzed for volatiles. The results indicated that phenol was the major measurable volatile constituent. It was concluded that since the phenol was predominant in the sample, the air sampling for phenol would be indicative of the total volatile content of the material.

These results support Boeing's earlier hazard evaluation finding that phenol was one of two major volatile components of the prepreg.

Further GC/MS analysis by Boeing Materials Technology and by the Ferro Corporation both verified that phenol was the major volatile component detectable by GC/MS of the prepreg and that monitoring of air for phenol would be indicative of total volatile loading (except for the formaldehyde component).

c. Analysis of Prepreg Material for Formaldehyde

Prepreg samples were heated in an oven at 225°C and the off-gassed material collected and analyzed for formaldehyde spectrophotometrically (chromotropic acid method). This is considered indicative of the free formaldehyde content of the material. It was found that formaldehyde content of the product was between 0.07 and 0.16 percent by weight.

The formaldehyde analysis results confirm Boeing's earlier estimation that since free formaldehyde was present in the material at low concentrations, the chemical should be monitored in air at the workplace.

5. Wipe Sampling for Surface Contamination:

Measured areas of phenolic prepreg samples were wiped with a solvent-wetted cloth. The phenol, formaldehyde, and antimony were then extracted from the cloth and measured. The results were reported as micrograms of chemical per square inch of material ($\mu\text{g}/\text{in}^2$). Due to an interference in the analytical method, formaldehyde was not measurable. Antimony was below the detectable concentration of $3.1 \mu\text{g}/\text{in}^2$. Phenol was detected at $18.8 \mu\text{g}/\text{in}^2$ indicating that the chemical was present in significant concentrations to be absorbed through the skin if sufficient contact is allowed between the product and unprotected skin. To protect against dermal exposure, a requirement for glove protection was implemented.

Medical Findings

A total of 76 workers have filed claims as a result of working with phenol-formaldehyde resins between August 1987 and December 1988.

During this period, the Boeing medical staff at Auburn made referrals and placed medical recommendations for skin and respiratory tract irritation, as well as for headache and nausea. Appropriate recommendations were made for protective equipment.

A sharp rise in the number of complaints occurred in April 1988. One worker was diagnosed by her physician as having permanent brain damage due to exposure to formaldehyde. A high degree of worker concern resulted. Many employees began to see this same physician. Some, not all, were told they had chronic formaldehyde poisoning with demonstrable antibodies and other

immune system changes. Expert physician consultants did not agree with the validity of the diagnostic tests or the conclusions.

An independent medical panel addressed the workers' claims through the Washington State Workers' Compensation process. Dr. Patricia Sparks, Director of the Occupational Health Clinic of Providence Hospital, Seattle, headed a university-level panel of internists, allergists, immunologists and psychiatrists.

At the time of the formation of the panel there were 43 claimants, 37 of whom agreed to be examined by the panel. A report was published in mid-January 1989 (Appendix E). The Sparks panel observed, among other findings, that reported patient histories indicated that several of the workers had previously experienced symptoms or signs indicative of skin or respiratory tract irritation related to work with phenolic or epoxy resin impregnated composite materials. However, most of the workers had no objective findings at the time of the examination.

Thirty of the thirty-seven workers were found to have medical criteria for diagnosis of anxiety (panic disorder) and depression. Eight had had previous episodes of depressive illness prior to working in the particular area of the Boeing plant, and two had had previous episodes of panic disorder. Further, most of the workers with a diagnosis of anxiety and depression had not received adequate treatment for these disorders. The panel emphasized that the physical symptoms experienced by the workers were not to be considered "all in their heads," thus somehow not important or treatable.

The panel felt that the existing medical literature would not support a conclusion that anxiety and depression, and the associated physical symptoms, could be attributable to low level chemical exposure on a more-probable-than-not basis. It did, however, recommend that the problem be studied. It also listed, as possibly playing a major role, such sociological factors as fear, distrust, misinformation from health care providers, group interaction, attorney/media involvement, or labor/management problems.

Epidemiology Findings

To identify the symptoms experienced by workers using the specialized phenolic prepreg, and to describe how the frequency of those symptoms changed over time, Corporate Epidemiology reviewed the Boeing medical records of all employees in the affected organization (A-3210). All visits to Boeing Medical for complaints that could possibly be related to phenol or formaldehyde exposure between January 1986 and April 1988 were compared with all visits made by employees of an organization that also worked with composite materials, but not phenolic

composite (A-3430). These two organizations work in separate buildings in the Auburn facility (17-02 and 17-05 buildings). There is some exchange of employees between the two organizations when dictated by workforce requirements.

This comparison showed that exposure to the phenolic composite may have been responsible for some of the increase in visits to Boeing Medical, but it was not the only cause. The frequency of visits by employees of both organizations increased at the time of introduction of the phenolic resin into production (see Table 1, below). This is true for visits for all symptoms combined, and for each of the individual symptoms studied.

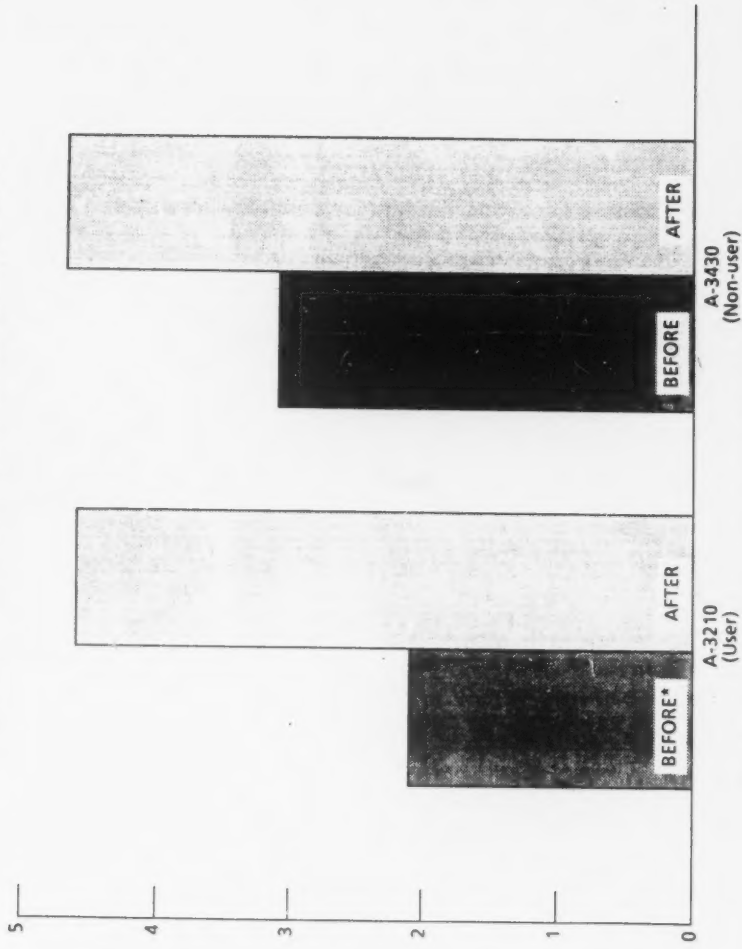
In addition, employees new to A-3210 differed in their medical visit behavior depending on their employment status prior to joining the composite-using organization. In the first four months of 1988, no employees new to The Boeing Company, and nine percent of those that transferred from all Boeing organizations other than A-3430 visited medical within their first month of employment in A-3210. In contrast, nearly 30 percent of those that transferred from A-3430 visited Medical within the first month of transfer (see Table 2, below).

These findings suggest that the phenolic composite is not the problem. Because the medical visit behaviors of both A-3210 and A-3430 were similar, but only A-3210 used the phenolic composite, it was determined that some other factors that affected both A-3210 and A-3430 must have been responsible.

Samuel Milham, Jr., M.D., M.P.H., Chronic Disease Epidemiologist for the State of Washington, reviewed the findings of the industrial hygiene surveys and the epidemiology study done by The Boeing Company, and concluded that what had occurred was an epidemic of symptoms due to irritation of the upper airways and skin. It was not, according to Milham, an outbreak of a recognizable syndrome, and was of a magnitude unexplained by the measured levels of chemical irritants.

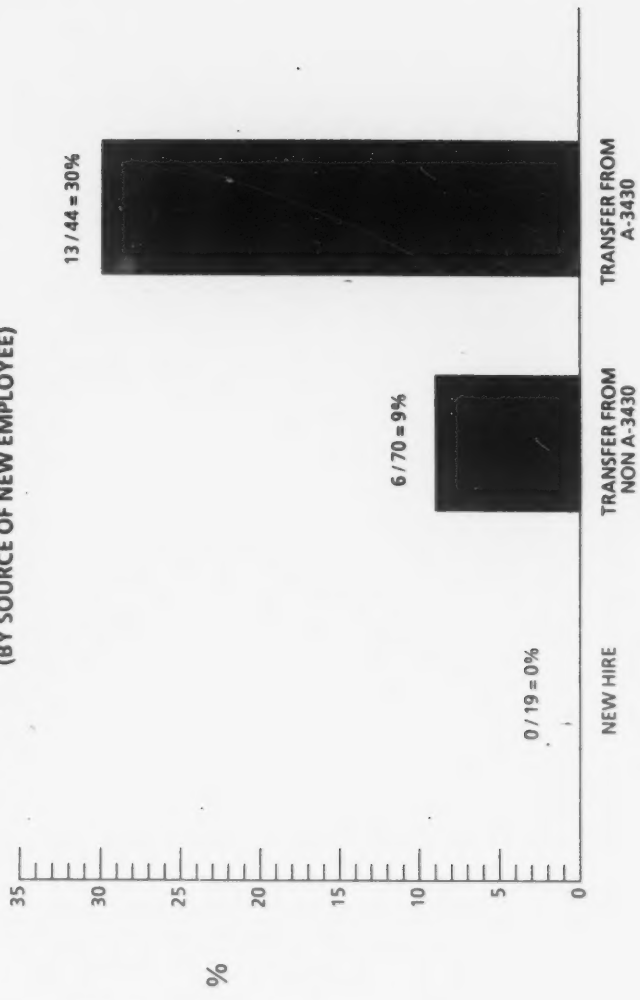
Refer to Appendix F for detailed information regarding the Boeing epidemiology study.

TABLE 1
MEDIAN NUMBER
MEDICAL VISITS/MONTH/100 EMPLOYEES
FOR ANY SYMPTOMS RELATED TO PHENOLIC RESIN EXPOSURE



* BEFORE AUGUST, 1987, DATE OF INTRODUCTION OF PHENOLIC RESIN INTO PRODUCTION

TABLE 4
PERCENT EMPLOYEES NEW TO A-3210
VISITING MEDICAL WITHIN
FIRST MONTH OF EMPLOYMENT*
(BY SOURCE OF NEW EMPLOYEE)



* BETWEEN 1/1/88 AND 4/15/88

Remedial Action to Complaints and Findings

Establishment of Task Forces

Several Task Force type teams were established to review and resolve the problems associated with the material in question. The chairman of The Boeing Company established a corporate team under the direction of the corporate vice president of operations. The purpose of the team is to pull together all the facts and find solutions to problems related to the handling of phenolic resins and formaldehyde by employees at the Auburn plant. The corporate team was established to work closely with the joint union/management health and safety committee.

A working committee was established at the V.P. level. This team established a control room to track the problem and expedite handling of employee medical claims, union concerns, and facilities requirements, and to coordinate communications with employees.

A vital concern was the growing adversarial relationship between the company and the union over the issue. Allegations appeared in the media that Boeing was knowingly exposing employees to chemical poisoning. Thus the Company/Union Executive Joint Health and Safety Committee was formed to investigate the use of phenolic resins and formaldehyde in the manufacturing processes at the Auburn site. In addition, this team resolved the following variety of problems related to employee transfer, attendance and benefits.

- Steps were taken to ensure that employees did not lose pay as a result of transfers due to medical restrictions. Any past actions in this regard were reviewed and corrected, if required.
- All new cases were coordinated to ensure proper company action.
- No disciplinary measures were taken based on poor attendance.
- A company focal point was established to receive, research, and immediately resolve any employee complaints related to payment of medical bills.
- An outreach plan was established in which a Boeing and union representative contacted each employee and provided assistance in filing workers' compensation claims and in requesting other benefits.

- An agreement was reached to:
 - Conduct an independent scientific study, and
 - Establish a subcommittee to address similar issues in the upcoming contract negotiations.
- The joint committee is acting as an ombudsman for employees who believe their concerns are not appropriately addressed through other channels.

This team has retained the consulting services of Dr. Bill Daniell, assistant professor of the University of Washington Department of Environmental Health; and Dr. Alan Ducatman, director of Environmental Medical Services, Massachusetts Institute Of Technology.

An Auburn Hazardous Materials Action Team has been formed under the direction of a senior operations manager who has been placed in a full-time special assignment. He chairs the Auburn committee and provides continuity between Auburn and the joint union-management committee.

The task of this team is: to identify all operations and/or processes that have potential or perceived health hazard exposure to division employees; to develop and implement plans for providing adequate facilities, possible process/material changes, and employee training; and to ensure that proper personal protective equipment is available and used.

Provision of Protective Equipment

Although not indicated by measured air concentrations, respirators and appropriate training were provided for any employees concerned about exposure to airborne contaminants. The requirement for glove use was strictly enforced by supervision, but the use of respirators was optional.

Installation of Ventilation System

Although all measurements showed only minimal levels of exposure to phenol and formaldehyde, the odor of the phenolic material was a persistent annoyance to the people working with it. Boeing ventilation engineers were assigned to develop a system that would reduce odors.

The air tube ventilation system, designed by Boeing ventilation engineers, was installed in June 1988 and was quite effective, except in the case of a few complex parts, such as video shrouds, which required the worker to come in close contact with the material during layup. The decision was made to install an air-conditioned booth, for those complex parts, designed to draw the odor away from the worker. The booth was installed for use in

August 1988 with a second booth scheduled for December 1988 as the rate of production increased. The booth was effective and was very well accepted by the people using it. (The second booth was subsequently cancelled when the decision was made to eliminate use of the specialized phenolic prepreg).

Training of Employees

To augment existing Hazard Communication training (described in detail in Appendix B), special Hazard Communication Training sessions were held with all 17-02 building employees to ensure that everyone was properly trained in handling hazardous materials, and aware of the resources available to help them and to establish communication regarding their health and safety concerns.

Communication to Employees/Establishment of Hotline

Boeing has established several mechanisms to ensure that health and safety information is communicated to employees, and to allow employees to communicate their concerns and achieve effective remedial action:

The Boeing Hazard Communication Program provides information to all Boeing employees about the hazards of the chemical materials with which they work. Through videotapes, hazard communication handbooks, classroom and on-the-job training, the program ensures that employees are informed the hazards of the specific chemicals and chemical processes in their work area; about chemical warning properties; and about protective measures.

Crew meetings are held monthly during which employees can ask questions and express concerns about health and safety issues. Portions of those meetings are devoted to health and safety issues.

Safety monitors are appointed from the hourly ranks and act as a conduit for employee questions and concerns. The safety monitors help ensure implementation of any required corrective action.

Employees are encouraged to inform their supervisors of any concerns; or they may contact the division Safety and Industrial Hygiene office or their Human Resources personnel representative directly.

Quality circles meet on a regular basis to develop ideas for improved work processes and working conditions. There are seven such quality circles in Auburn's 17-02 Building with a total membership of 60 hourly employees.

In response to employee concerns about the phenolic prepreg in Auburn, other lines of communication were opened, including the

establishment of an employee hot line to allow workers to voice concerns and ask questions related to chemical exposure. In October 1988, the Fabrication Division vice president and general manager issued a memo to all employees expressing his concern for their health and safety. He reminded all employees that the use of protective equipment is their responsibility and a condition of their employment. He charged management to ensure that the equipment was available and utilized. The response has been positive.

Facility Enhancements

A number of employees in the 17-02 building layup area expressed a dissatisfaction with their work environment when compared to the more modern layup areas in the adjacent 17-05 building, in which many of them had worked previously. In an effort to improve the work environment and employee morale, the building interior was repainted and new work benches were installed in May 1988.

Dr. Ducatman and Dr. Daniell, medical consultants, observed that, in accordance with good hygiene practice, eating and smoking should be done outside of the work area. In early December 1988, the company placed four 12x50-foot trailer units adjacent to the 17-02 building to be used as employee lunch rooms. The units were furnished with tables, chairs, refrigerators, and microwaves. Vending machines with food and soft drinks have been moved into adjacent areas for employee convenience.

Processing of Workers' Compensation Claims

The Department of Labor and Industries in the State of Washington administers workers' compensation claims or allows employers who meet stringent financial requirements, such as The Boeing Company, to self-insure and thereby assume the risk and responsibility for management of claims.

The Department of Labor and Industries receives copies of accident reports, notification and termination of time-loss payments, and oversees and monitors each self-insurer's program to ensure compliance with the Industrial Insurance Law. In addition, the Department of Labor and Industries reviews all claim determinations, and intervenes when necessary to resolve disputes between employees and self-insured employers.

Boeing has contracted with a third-party claims administrator, Aetna Technical Services, Inc., to administer the workers' compensation claims of Boeing employees in the State of Washington.

As of June 13, 1988, Aetna Technical services had received approximately 19 claims associated with the phenolic resin layup operation, and approximately 70 employees had been seen at Boeing

Medical in Auburn. A total of 76 workers had filed claims by December 1988.

Aetna Technical Services did not have sufficient medical data to accept these claims at the outset. Therefore, provisional time loss was paid to those employees who were off work because of their alleged chemical exposure. Their diagnostic medical bills were paid in full.

Boeing continued with its internal evaluation of the 17-02 building at the Auburn plant relative to chemical use in compliance with established standards. The results of these studies were necessary to ascertain if the claims were to be accepted or denied. Aetna Technical Services requested that the decision to accept or deny these cases be held in abeyance pending a complete investigation. The Department of Labor and Industries approved this request.

The preliminary industrial hygiene report, released June 1, 1988, indicated the levels did not exceed established standards for phenol and formaldehyde.

Since a causal relationship of the claimants' symptoms to their employment environment was not apparent, an independent medical panel was established pursuant to Revised Code of Washington (RCW) 51.32.110, and the rules of the Department of Labor and Industries. Dr. Patricia Sparks headed the panel to evaluate the claimants' medical conditions and any probable connection to their employment. She selected the appropriate panel physicians, and established a protocol to examine 37 claimants. The examinations were conducted between October 5, 1988 and October 27, 1988. Panel findings are discussed elsewhere in this report (see Appendix D).

The panel's summary report and reports on the individual claimants were completed and sent to Aetna Technical Services and Boeing on January 20, 1989. However, addendum reports were requested to clarify specific issues. These reports are expected in the near future.

Aetna Technical Services and Boeing intend to complete the final adjudication of these 37 claims by March 15, 1989, and submit these findings to the Department of Labor and Industries for approval. An Order and Notice will be issued regarding these results, and each claimant will have 60 days to file an appeal. If the claimants appeal the Department of Labor and Industries Order, their cases will be discussed at a settlement conference before a judge of the Board of Industrial Insurance Appeals. If no settlement is achieved, dates will be set for a formal appeal before a different judge, and both parties will abide by the same rules of evidence used in a court of law.

Boeing has actively explored and implemented procedures to respond to these employees, including the following, even though they exceed Boeing's workers' compensation obligations.

- (1) Voluntary payment of provisional time-loss benefits during the period the claims are held in abeyance;
- (2) Continuing workers' compensation benefits for those claimants who were requested, but refused, to participate in the independent medical examination scheduled by Aetna Technical Services;
- (3) Designating representatives, both within Boeing and Aetna Technical Services, to address claimant concerns regarding any Aetna Technical Services claim representative;
- (4) Management of medical bill payments not otherwise compensable under Workers' Compensation, by directing these bills to private medical insurance coverage and funding any outstanding balances; and
- (5) A plan to forego requesting repayment of any provisional time-loss benefits if any claim is denied.

Conclusions

Boeing reviewed the specialized phenolic prepreg for health and safety considerations prior to introduction into the production environment. It was determined that the material presented no significant health hazard. This assessment was later verified, during production use of the prepreg, by extensive air monitoring by Boeing health specialists and by regulatory agencies such as NIOSH and the Washington State Department of Labor and Industries.

Some employees who worked with the material found the odor offensive and irritating. Several consulted a local physician who concluded that some of these employees suffered from "formaldehyde poisoning." This physician has shared very few details of his medical findings with Boeing physicians or with other health professionals. His conclusion, therefore, was never verified.

Boeing management and the union are working together in an attempt to resolve these issues. Recognized outside experts have been consulted, including: Dr. Patricia Sparks, Director of the Occupational Health Clinic of Providence Medical Center in Seattle; Dr. Bill Daniell, Assistant Professor of the University of Washington Department of Environmental Health; and Dr. Alan Ducatman, the Massachusetts Institute Of Technology's Director of Environmental Medical Services. Extensive toxicological, epidemiological and industrial hygiene analyses have been performed. None of the relevant scientific data supported the allegations of "formaldehyde poisoning." Nevertheless, Boeing

determined that the only way to resolve employee concerns was to discontinue use of this product. It was therefore removed from use at the Auburn facility in December 1988.

Future Considerations

The success of our industry is dependent upon continuous advancement of aerospace technology. Continuous development of composite materials is key to the success of our industry. Concurrent with advancing technology, we must continue to ensure that we do not introduce health and safety problems into the workplace.

We certainly recognize that health and safety can be a major concern with new materials. In response to this, and in the spirit of continuous improvement, the aerospace industry has begun a coordinated effort to review and improve health and safety programs and practices.

Working with the Suppliers of Advanced Composite Materials Association (SACMA), an Aerospace Industries Association (AIA) ad hoc team is developing an industry-wide plan of action. This on-going effort was announced at an Air Force Conference held in February 1989 to share information on new technology materials between the manufacturer, the user, and the airline customer. This was considered the first step in creating a forum to foster continued communication and cooperation between these parties.

Among the challenges that we must address are the following:

Health and safety issues must be addressed early in the product development processes.

Management, employees and the union must work together as we strive to develop a safe and acceptable work environment.

Our work environment must be designed with employee comfort, health, and safety in mind.

Employee sensitivity to odors and other sensory issues that fall outside of the regulatory arena must be seriously addressed. Such issues will become more important as we strive to make our workplace not only safe and healthful, but also acceptable to our employees.

Employees must be provided with understandable and easily available information about the hazards of the work environment

Accurate and complete chemical hazard information must be provided by chemical manufacturers. Effective response to issues such as those addressed by this committee require this. The Hazard Communication regulation must be strengthened in order to require chemical manufacturers to

provide us with Chemical Abstract Service (CAS) numbers and Superfund Amendments and Reauthorization Act (SARA) chemical hazard classes for all hazardous chemicals.

The challenge for this committee is to review these issues in-depth; and to involve world-class health professionals who are on the leading edge of medical science. It is imperative that we review the best scientific information available prior to developing any conclusions. We look forward to cooperating with you in this effort.

TESTIMONY OF
CHARLES L. ELKINS
DIRECTOR
OFFICE OF TOXIC SUBSTANCES
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

MONDAY, MARCH 6, 1989

Introduction

Mr. Chairman, Members of the Committee, thank you for this opportunity to discuss the implementation of the Toxic Substances Control Act (TSCA), and to provide some insight into the ways in which TSCA affects the development, manufacture and use of chemicals in the aerospace industry. Since this Subcommittee has continuing responsibility for the oversight of the implementation of TSCA, and this is the first opportunity the Agency has had to testify before the Subcommittee, this testimony elaborates at length on the provisions of TSCA and our implementation of them.

Overview of Major TSCA Authorities

By enacting TSCA, Congress established a number of new requirements and authorities for identifying and controlling toxic chemical hazards to human health and the environment. EPA's TSCA program has four major goals:

- 2 -

- o To ensure that new chemicals enter commerce with proper controls;
- o To identify existing chemicals which pose unreasonable risks;
- o To reduce unreasonable risks from marketing and use of existing chemicals; and
- o To remove unreasonably hazardous chemicals from continued use.

Exclusions from TSCA coverage include: pesticides, drugs, food, food additives, cosmetics, and certain other chemicals which are controlled by other statutes.

I will describe each of these efforts in turn, starting with the new chemical program. In each area, I will review what TSCA efforts may affect the aerospace industry, and I will discuss our coordination with other Agencies such as OSHA to control health and environmental concerns.

I. Ensure that New Chemicals Enter Commerce with Proper Controls

Section 5 of TSCA provides the unique authority to evaluate, and control where appropriate, the risk associated with the development and commercialization of new industrial chemicals. The task before EPA under section 5 is to differentiate among chemicals posing unreasonable risks, those posing risks that can be adequately controlled, and those that pose limited or no risk.

Briefly, section 5 requires manufacturers and importers to give EPA a 90-day advance notification of intent to manufacture or import a new chemical substance for commercial purposes. This

Premanufacture Notification (PMN) allows the Agency to evaluate the information available on the new chemical and to select one of a number of alternatives. EPA may prohibit or restrict a new chemical under section 5(e) of TSCA if the Agency determines that the chemical may present an unreasonable risk and there are insufficient data to permit a reasoned evaluation, or may prohibit or restrict a new chemical under section 5(f) of TSCA if the Agency determines that the chemical will present an unreasonable risk. EPA may also determine that there are few or insignificant risks associated with the chemical and allow the unrestricted commercialization of that product.

Our accomplishments in the program are twofold: First, by the authorities given us in section 5, we have developed a new chemical review process to identify and appropriately control chemicals of concern. Second, although not specifically required by the statute, we have gradually brought about significant changes in how the chemical industry does business. These changes are most readily seen in the areas of safer processes and operations; more consistent use of adequate personal protective clothing; selection of "safer" alternatives where they exist; and, ~~perhaps~~ most importantly, research on and development of "safer" chemicals.

Section 5 of TSCA only requires the submission of toxicity test data that are available or reasonably ascertainable, but does not require toxicity testings. Many submissions, in fact,

carry with them some test results; however, over fifty percent of the new chemical notices do not contain test data; for those that do, most of the data commonly consist of acute lethality and local irritation studies. Other types of studies such as mutagenicity, sensitization, repeated dose toxicity, and so on, are received in fewer than 15% of the notices.

Because of this general lack of data, we have come to rely heavily on Structure Activity Relationships (SAR) as a screening tool to help us decide which new chemicals need to be controlled or tested. EPA has developed SAR techniques for hazard assessment which can be used in the presence of little or no toxicology data on the substance itself.

EPA's approach to evaluating the potential hazards of PMN chemicals is used for the purpose of screening chemicals in order to identify those substances which are most in need of additional review or further testing.

Briefly, the approach involves 4 major components: The first component is an evaluation of the available toxicity data on the chemical itself. Given that test data on PMN chemicals are rarely found in the scientific literature, this effort consists of a critical evaluation of submitted data on the PMN chemical. In 51% of all PMN cases, however, no test data are available and submitted data rarely pertain to effects other than acute toxicity and local irritation. This is a serious limitation since studies such as mutagenicity, oncogenicity,

reproductive/developmental toxicity, repeated dose toxicity, pharmacokinetics, acute/chronic, aquatic toxicity, etc., are generally viewed as being more critical to an overall assessment of the health and environmental hazards than are the mammalian acute/local toxicity studies which are typically available on PMN chemicals.

The second component is an evaluation of test data available on substances which are "analogous" to the PMN chemical ("analogues"), or data which are available on key potential metabolites or their analogues. Analogues are selected on the basis of two factors: similarity to one or more structural, functional, and/or physical chemical features in the PMN chemical which have been identified as being of possible importance in the subject chemical's toxicity, and the availability of pertinent toxicologic data on the selected analogues. In this process, EPA also identifies key potential metabolites of the PMN chemical.

The third component involves the use of mathematical expressions for biological activity or "quantitative structure activity relationships," also known as QSARs. The use of QSARs at present is limited to the estimation of physical properties such as water solubility, log P (an indicator of bioabsorption), vapor pressure, etc. and in the estimation of acute aquatic toxicity and bioconcentration factors.

The final and most critical component consists of the knowledge and judgment of scientific assessors in the

interpretation of the information developed in the course of the assessment. Given that the preceding components, even when combined, will generally produce a limited set of useful information, the importance of this last component becomes apparent. This is especially so in the case of information developed on analogous substances and key metabolites which must be critically evaluated and interpreted in terms of the weight that should be applied to each as a function of its "closeness" to the PMN chemical, in terms of the likelihood of their formation and toxicological significance. Thus our task is to evaluate the toxicological potentialities of the PMN chemical and its projected metabolites, using submitted data and extrapolations of data available on suitable analogues.

In performing this task, EPA must consider a variety of parameters as they apply to the PMN chemical and in comparison, to the analogue chemicals. These parameters can include:

- o Comparison of the PMN chemical to potential analogues in terms of physical chemical properties, molecular weight, molecular topology, etc.;
- o relative potential for absorption by skin, pulmonary, and gastrointestinal routes;
- o biotransportation pathways, especially metabolic activation and/or deactivation pathways, for the PMN chemical versus its potential analogues;
- o relative differences in distribution and excretion in organisms;
- o consideration of possible mechanisms of toxicity, including the relative abilities of the PMN chemical and its analogues to operate via these mechanisms, and other parameters depending on particular aspects of the case.

After consideration of all of these factors and weighing of the available information, we prepare a critical evaluation of the potential hazards of the PMN chemical. Using available data on the chemical itself, and critically evaluating the pertinence and reliability of any data on analogues or metabolites, the assessors develop assessments of the probable fate and effects of the chemical, and, if potential hazards are identified and supported, determine the further testing needed to adequately assess the hazards presented by the PMN chemical.

If we decide that activities involving a new chemical may present an unreasonable risk of injury to health or the environment, we can exercise one of these options: First, we can give the new chemical submitter the option of either performing the needed tests prior to commercialization, or controlling activities associated with the chemical as though it had been tested and found to be as toxic as we had suspected. We would normally use the latter approach where the costs of testing are substantially higher than the likely profit margin of the new chemical. Second, we can require the submitter to perform these tests before the chemical is produced. This approach is usually taken when we believe that exposure to the chemical cannot be controlled, where the chemical may prove to be too risky for its intended use, or where the costs of testing can be borne by the PMN submitter within a reasonable period of time, such as one

year without adversely affecting production of the chemical. The third approach is to require testing once production of the new chemical reaches a prescribed trigger -- usually it is a volume trigger (e.g., 100,000 kilograms) or a time trigger (e.g., 2 years after a chemical is first produced). Of course, until the trigger is met, the chemical must be controlled to minimize the risks. This approach is typically used where the chemical has some potential for hazard or where information is very uncertain and exposure potential is significant, but the cost of the needed testing is large relative to the short term revenues.

Normally, the production volume trigger for testing would be determined on the basis of both the costs of the testing and the potential hazard. By using these three approaches, we believe that we are achieving our statutory mission of preventing unreasonable risk to health and the environment from new chemicals while following the Congressional mandate of not impeding unduly, or creating unnecessary economic barriers to, technological innovation (Section 2(b)(3) of TSCA).

Since 1979, EPA has received over 11,600¹ PMN submissions for review. EPA has issued 190 section 5(e) orders on over 275 chemicals restricting or modifying the nature and/or extent of commercialization available to these chemicals. Approximately 87% of these orders have required some form of protective equipment. The remaining 13% restricted either the use or

¹ As of the end of FY '88.

physical form of the chemicals. In addition to the protective equipment requirements, 25% of these orders trigger some form of toxicity testing. Further, the chemical industry has "voluntarily" tested or taken control actions on an additional 498 chemicals. In actions of another type, industry has voluntarily withdrawn 515 PMNs from review, oftentimes in the face of an expected section 5(e) or 5(f) order.

We believe these numbers, but more importantly the actions behind them, represent the accomplishments of a successful new chemical program. To understand the magnitude and impact of the New Chemical Program, it is useful to keep in mind that of the over 11,600 total PMN submissions received to date, about 10% have required some form of action or regulation.

EPA has also managed an enforcement and compliance monitoring program to ensure that persons subject to the new chemical reporting requirements have fulfilled their obligations under the Act. To date, EPA has completed 720 inspections to determine if section 5 violations have occurred. Twenty-nine administrative civil actions have resulted from these inspections, and from other initiatives.

EPA has received 33 PMNs to date where the end uses of the chemicals of concern were identified in the submission as aerospace specific. These chemicals were either epoxy resins or epoxy adhesives, or were additives to resin or end-use formulations, such as plasticizers, stabilizers, or sag control

agents. Each of these chemicals was screened for potential risk by the Agency; however, Agency scientists did not believe that there was sufficient basis for follow-up action or regulatory control. Details of these cases can be made available to the committee, but because of the confidential business information involved, this is not the proper forum for that discussion. I would also like to note that these 33 submissions likely represent a lower bound of the actual number of PMNs received on chemicals with aerospace end-uses - many submissions are received where the end-use is stated generally, such as "adhesive component" or "composite component," and in such cases, the finished product may have aerospace applications.

I would like to share with the Committee a recent policy development which we have initiated in the new chemical area. Under the statute, we have authority to require needed test data either because of concerns based upon projected toxicity potential, or because the volume and use of the chemical may lead to significant or substantial human exposure or substantial environmental release. In the past, the New Chemical Program was managed primarily from the standpoint of suspected toxic potential. We have now broadened this focus to include potential high volume and high exposure chemicals whose toxic properties have not been well characterized. We are now requiring needed test data for chemicals with projected production volumes of over 100,000 kilograms per year that result in either substantial

exposure or release, even if our SAR analysis does not raise specific toxicity concerns. We believe this will allow us to make more informed determinations regarding the risk of those chemicals which have a higher potential for human exposure and release to the environment.

To improve our ability to focus resources on those chemicals which present the greatest potential risk, we have successfully developed approaches which allow for early exit from our new chemical review process for those chemicals which in all likelihood do not pose a significant risk. We have adopted these approaches through formal rulemakings which allowed for full public input into our decisions. We have reduced the burden on both EPA and industry for several low risk categories such as certain polymers and low volume chemicals (under 1,000 kilograms per year). We have done this by (1) requiring industry to provide less information than on the typical new chemical, and (2) allowing manufacturing to commence after 21, rather than 90 days. To date, we have reviewed almost 2,400 exemption applications. Thus, since 1979, the Agency has reviewed approximately 14,000 section 5 notices.

Section 5 of TSCA also allows the Agency to issue Significant New Use Rules (SNURs) on chemicals. SNURs require persons to submit notices to EPA prior to manufacturing or importing a chemical for a new (i.e., non-ongoing) use. If after PMN review, EPA determines that a significant new use of the

chemical other than the use specified in the PMN may pose an unreasonable risk, the Agency has an option to control this risk.

A SNUR enables EPA to monitor and restrict new uses of chemicals that may increase exposure before a designated new use occurs. The reporting triggers under such a rule may include changes in the method of distribution or disposal of the chemical. The rule requires notification and reporting of data relating to the new use of the chemical to EPA 90 days before the new use is commenced. If, during the 90-day review period, EPA determines that the chemical may or will present an unreasonable risk, the Agency may control the chemical using the same 5(e) or 5(f) procedures that are used for PMNs.

To date, we have issued SNURs only on a chemical-by-chemical basis. The outcome of this resource-intensive process has been 15 final and 42 proposed SNUR for new chemicals. It is clear that a more effective approach for dealing with new uses must be found. We are attempting to address this problem through development of an expedited procedure for using SNURs. A procedural rule that will abbreviate the review and development process has been proposed and is in the final stages of promulgation. The rule was developed through a public process that included interested parties from environmental groups and the chemical industry. We expect to publish the final rule within the next several months.

The revised approach promulgated in this rule will simplify the process, minimize the time the chemical use may not be covered by the rule, make the rule triggers easier to understand, and, therefore, aid compliance.

II. Identify Existing Chemicals Which Pose Unreasonable Risks

The second goal of the Office of Toxic Substances is to identify out of the universe of approximately 65,000 existing chemicals those which pose unreasonable risks and need to be regulated. The quality and timeliness of these decisions are directly proportional to the quality and availability of data related to this universe of chemicals upon which to base these decisions. To provide EPA with these data, two separate provisions were included within TSCA: Section 4 and section 8. Section 4 creates a mechanism for establishing testing priorities and requiring testing by industry. Section 8 provides vehicles for requiring the reporting to EPA of specific types of information already available to industry. In addition to sections 4 and 8 of TSCA, the Office of Toxic Substances (OTS) also implements section 313 of the Emergency Planning and Community Right to Know Act, which has provided valuable information that we are using to screen potentially risky chemicals. I will elaborate on our implementation of each of these authorities.

First, TSCA section 4 gives EPA the authority to require manufacturers and processors to test the chemicals they manufacture and process. Our test rules specify the chemical or category to be tested, health and environmental effects for which testing is required, test standards, schedules for submission of data and who is responsible for conducting testing. In order to require testing, we must find that there are insufficient data available with which to reasonably determine or predict the effects of the chemical, and that testing is necessary to generate such data, and either (1) a chemical may present an unreasonable risk or (2) that there is substantial production, exposure to humans, or release to the environment.

To date, much of the use of our testing authority has focused on testing in response to the recommendations of the Interagency Testing Committee (ITC). The ITC was created by section 4(e) of TSCA, and its membership consists of representatives of the National Institute of Occupational Safety and Health, the National Institute of Environmental Health Sciences, the Department of Labor Occupational Safety and Health Administration, the National Cancer Institute, the Council of Environmental Quality, the National Science Foundation, the Department of Commerce, and EPA.

To date, we have developed over 40 proposals and completed 25 test rules. As a result of these rules and of similar testing agreements we have negotiated with industry, we have received

about 700 studies. These studies represent approximately \$21 million worth of testing.

Eleven of the chemicals for which testing is underway or completed have uses in the aerospace industry. Three others are under active review for testing consideration.

While our major use of section 4 thus far has been in responding to ITC recommendations, we have also begun to use this TSCA authority in several new ways to support our own and other programs' efforts to control toxic chemicals.

Using the joint authority of sections 4 and 8, EPA promulgated a rule in 1987 that requires manufacturers of a number of commercial chemicals to test their products for contamination by chlorinated or brominated dioxins and furans. This rule represents the first time EPA asserted its authority to require industry to test its products for the presence of a hazardous substance. In the past, we have only required reporting of existing chemical data or testing of products for their toxic properties.

Another new direction in the section 4 program is use of TSCA to obtain test data for other EPA programs. In the past 2 years, test rules have been written for the Office of Water and the Office of Solid Waste. The latter rule contained testing requirements for 23 individual chemicals. We plan to develop additional rules for other EPA Offices as well as other Federal Agencies in the future.

EPA staff are constantly trying to improve the section 4 process to achieve a smoother, quicker and less time-consuming data collection program. Although we had high start-up costs in the beginning and a few set-backs along the way, we have learned several important lessons from these experiences. We have significantly improved the test rules process within EPA and have streamlined our interaction with the ITC.

We have developed two approaches to accomplish this. The first is expedited rulemaking for individual chemicals. In this approach we rely upon ITC's analysis as the primary technical basis for our proposed rule. This allows us to issue test rules for individual chemicals in as little as 18 to 20 months. (The time required for any specific rule will vary because of the number and kinds of tests required, the complexity of the issues associated with exposure, the difficulty of determining who should test, and the difficulty of determining how tests should be conducted.) By using the expedited approach in the future, we expect to be able to issue individual test rules for 10 to 15 chemicals per year.

EPA has developed an approach to gather data under section 4 which, in certain instances, is more expeditious and less expensive than rulemaking. If EPA finds that affected manufacturers and processors and interested members of the public agree with the agency regarding the need for--and scope of--testing requirements, EPA may issue an enforceable consent order

to expedite the testing. These testing consent orders are legally binding and have sanctions for non-compliance. EPA has developed this approach working with both the Chemical Manufacturers Association and the Natural Resources Defense Council.

Our second and more efficient approach is to group chemicals with similar exposure or other common characteristics. This simplifies the task of analysis and documentation for making one or more of the required findings. These rules, which take about the same amount of time to develop as individual chemical test rules, are capable of handling 10 to 50 chemicals at a time. This will result in a saving of considerable resources and time versus individual chemical rulemaking. There is, however, one major limitation of the multi-chemical rule approach. It can be used only for chemicals that can be grouped with an appropriately strong common characteristic. Consequently, there will still need to be a strong reliance on individual chemical test rules.

Two new provisions of law under the Superfund Amendments and Reauthorization Act (SARA) may have a big impact on the Section 4 program of the future. The Toxic Release Inventory requirements under Section 313 of that Act, which we administer, may reveal new potential exposures to toxic chemicals that had previously gone unrecognized. Some of these chemicals are likely to be inadequately characterized from a hazard point of view. These situations will serve as a potential source of candidate

chemicals for consideration by the section 4 program.

Section 110 of SARA directs the Agency for Toxic Substances and Disease Registry (ATSDR) to prepare toxicological profiles on at least 275 substances most frequently found at sites on the Superfund National Priority List and posing the most significant potential threats to human health. Based on these profiles, ATSDR must determine whether adequate information on the health effects of these substances is available and, if not, initiate research programs to fill those critical inadequacies. Section 110 specifically states the sense of the Congress that TSCA be used where possible to place the costs of such testing on the manufacturers and processors of the chemicals, and we in EPA have been working with ATSDR and the National Toxicology Program (NTP) to implement this goal. We have worked hand in hand with ATSDR and NTP to devise procedures that will allow TSCA section 4 to be applied efficiently to groups of SARA section 110 chemicals as their priority research needs are defined. We look forward to proposing our first rule using this approach in 1990.

The other major components of our information gathering function are our section 8 programs.

The authority that is provided in section 8(a) of TSCA allows the collection of production, use, and exposure data from chemical companies, and can require the retention of certain records. Because rulemaking is often a lengthy, difficult, and expensive process, EPA developed a "model rule" called the TSCA

section 8(a) Preliminary Assessment Information Rule (PAIR) to collect the basic, readily obtainable data needed for preliminary risk assessments on specified substances. To date, EPA has used this rule to gather data on approximately 380 chemical substances.

At the request of the EPA Office of Air, 17 chemicals recently were added to our PAIR regulation. Data reported under the rule will be used to help evaluate and set priorities among candidates for Clean Air Act regulations as toxic air pollutants. This rule is an important milestone in our efforts to use TSCA to coordinate and fill the information needs of other offices -- a strategy that is expected to lead to cost savings for both industry and government by avoiding duplicative information gathering.

In addition to the PAIR, EPA also promulgates chemical-specific rules under section 8(a) which mandate slight variations in reporting and recordkeeping requirements. At present, EPA has issued chemical-specific rules on 30 chemicals.

The Agency has now completed its most ambitious information gathering rule to date -- a second model rule to gather more detailed and comprehensive information. Called the Comprehensive Assessment Information Rule (CAIR), its reporting form includes an extensive list of questions for which reporting by chemical companies can be required. Each time data are needed EPA will amend the rule by adding the subject chemicals and identifying

the specific questions to be answered.

The universe of potential users for CAIR is broad. It includes EPA and other Federal agencies needing information from industry to support risk identification, risk assessment, and regulation of chemical substances. It also includes other organizations that are involved in efforts related to health and/or the environment and that require the types of information which will be already available on a CAIR centralized data base.

All together, we have gathered, or are in the process of gathering data on almost 450 chemicals using the authority of section 8(a). Of these, we have determined that 20 are in use in the aerospace industry.

Under section 8(b) of TSCA, EPA is required to compile and keep current a list of each chemical manufactured or processed in the United States. Approximately 65,000 chemicals are currently listed on that "inventory," and more are added as we receive notices of commencement of manufacture through the PMN process. About 45 percent of all PMNs are eventually followed by a notice of commencement. In addition to the growth of this list through the PMN process, every 4 years production volume and production facility information is updated through the inventory update rule.

Section 8(c) of TSCA requires manufacturers and processors of chemical substances and mixtures to maintain records of allegations of adverse effects to human health or the environment

believed to have been caused by the chemical substances or mixtures. Any person may make such an allegation, including an employee, a private citizen, a plant neighbor, or another company representative on behalf of its employees. While the allegation need not be supported by scientific or medical evidence, for the purposes of Section 8(c), it must establish a link between a chemical substance or mixture, a particular company's product, process, or effluent, and any "significant adverse reaction" experienced by the public or environment. Manufacturers and processors are required to collect, record, file, and retain these allegations.

Section 8(c) of TSCA requires that a worker or consumer allegation be recognized and retained by industry. EPA expects that individual companies will use the 8(c) records to identify problems associated with the chemicals that they manufacture, and will subsequently take steps toward resolving identified problems.

This section also serves to create a historical record of significant adverse reactions alleged to have been caused by a chemical substance, mixture, process, or effluent. It thus provides a means to identify previously unknown chemical hazards and to reveal patterns of adverse effects that might otherwise either go unnoticed or go undetected for long periods of time. EPA can inspect such records and require that the industry report the information contained in them to the Agency.

We have requested that persons manufacturing 3 chemicals with aerospace applications, all diisocyanates used in resin production, submit copies of allegations on those chemicals to the Agency.

Under TSCA section 8(d) authority, EPA can require chemical companies to submit unpublished health and safety studies on chemical substances and mixtures. Respondents to these rules must submit two types of data: copies of studies in the possession of, or available to, the company; and, lists of ongoing or completed studies that the company knows about, but does not have.

By using a "model rule," EPA is able to ensure, in a relatively easy fashion, that it has all available unpublished health and safety data on specific chemicals of concern. A model rule is used by simply adding those chemicals for which reporting is desired to an established list of reporting requirements. Reported data are used to assess potential risks, and in many cases to support decisions on whether to require industry to test those chemicals when data are insufficient. Two hundred forty-two chemical substances and 15 categories of substances are currently listed on the section 8(d) rule.

OTS has been working diligently to make our TSCA information-gathering rules as valuable to other EPA program offices, and other Federal agencies, as they are to OTS. Our initial effort to extend use of section 8 rules to other EPA

offices and to other agencies was launched with the publication of a section 8(d) Health and Safety Data Rule in January of 1986 (51 FR 2890). This rule listed 33 chemicals that had been nominated by the Office of Solid Waste. This was followed by a second 8(d) rule in May 1986 (52 FR 16022). This second rule listed 102 chemicals, of which 26 were nominated by OTS, and the remaining 76 were nominated by other offices in EPA and one other agency (the Consumer Product Safety Commission).

All of these data have been used in a variety of ways. For instance, OTS, in conjunction with the Interagency Testing Committee, has used the studies submitted in response to this rule to recommend testing on one of the diisocyanates. Other EPA Offices are using the data in an over-all review of diisocyanates, and for use in preparation of health assessment documents on three diisocyanates.

CPSC has used the diisocyanates information in a scoring effort which resulted in a decision not to take any action at this time.

NIOSH has used the section 8(d) data in their ongoing Health Hazard Evaluations. The data were also the basis for an EPA recommendation to OSHA to lower the permissible exposure levels for diisocyanates.

EPA has also used monitoring data, human health effects, and aquatic effects data gathered under section 8(d) in water quality advisories, drinking water health advisories, and regulations.

All together, we have gathered, or are in the process of gathering data on more than 400 chemicals using the authority of section 8(d). Of these, we have determined that 25 are in use in the aerospace industry.

The section 8(e) program, requiring manufacturers and processors to notify EPA of new information on substantial risks, has clearly been the most productive of all the section 8 authorities in identifying potentially hazardous chemicals.

Since the effective date of TSCA, more than 750 initial section 8(e) submissions have been received by EPA and given priority evaluation and follow-up attention. In addition, companies have volunteered more than 640 "For Your Information" submissions.

Substantial risk notices often include preliminary findings from toxicity testing programs, such as cases of excess tumors developing during the course of a study on rats or mice. Other notices may report untoward effects on humans in the workplace, or ecological effects data, while a few have reported groundwater contamination.

EPA's implementation of this provision has brought about heightened industry awareness of potential chemical risks. For example, many companies have reported that in direct response to their submissions they have voluntarily taken action to notify workers, customers, and others; changed labelling and handling practices; initiated further toxicity and exposure studies; or,

even ceased production.

OTS has received several 8(e) submissions on chemicals which have applications in the aerospace industry, although most of these submissions do not specifically address risks in the aerospace industry. However, there have been several section 8(e) submissions that resulted from incidents or studies directly linked to aerospace applications:

1) In 1979 the Aero-General Corporation reported the identification of eleven chlorinated organics in groundwater at a plant site near Sacramento, California. This finding led to technical support by EPA Region IX for regulatory action taken by the state of California to prevent further site contamination and ensure appropriate site clean-up.

2) In 1980 the Lockheed Missiles and Space Company reported that two employees suffered "prolonged neurological damage" possibly due to exposure of breakdown products (during an accidental reaction) from a mixture of a 4,4'-methylenedianiline (4,4'-MDA)-epoxy resin and diaminodiphenyl sulfone. This information was referred informally to NIOSH and OSHA, which have the primary Federal jurisdiction related to occupational health.

3) In 1987 Dow Corning Corporation reported preliminary carcinogenicity findings from a rat study on a material similar to a product which is a mixture of siloxane polymers and a metal salt. Dow Corning reported that this product is used almost exclusively in defense/aerospace as a foam for "potting"

((encapsulation) applications. 2-Ethylhexanoic acid (EHA) was identified as a reaction byproduct of the Dow Corning product. EHA is a teratogen in rats and is also subject to a TSCA section 4 test rule for carcinogenicity and other effects. OTS has received section 4 test data on the developmental toxicity of EHA and is awaiting data from other types of studies. Relevant information has been referred informally to NIOSH and OSHA.

4) In 1988 the Boeing Company reported results from an epidemiological investigation of miscarriages in women at their Auburn, Washington plant. OTS's preliminary evaluation concluded that particular chemical exposures cannot be clearly linked to the miscarriages because of limitations in the study but that the study does signal the need for more extensive examination of the miscarriage rate. OTS recommended to Boeing that any further studies conducted by the company should place emphasis on the implicated polymeric resin and epoxy adhesive as well as any other components of those products. This information was referred informally to NIOSH and OSHA.

As part of our ongoing program of ensuring compliance with TSCA by the regulated community, the Agency's enforcement and compliance monitoring program has conducted 952 inspections of facilities for section 8 violations, and has issued 17 administrative civil actions.

Under section 313 of the Emergency Planning and Community Right-to-Know Act, certain businesses are now required to submit

reports each year on the amounts of chemicals their facilities release into the environment, either routinely or as a result of accidents. Reporting is required for 308 discrete chemicals, and 20 categories of chemicals. The deadline for the first annual reporting cycle was July 1, 1988. In response to the reporting requirements, EPA received over 65,000 reports from facilities that manufactured or processed over 75,000 pounds of any listed substance.

We have identified 78 chemicals for which section 313 reporting was conducted that are used in the aerospace industry. We received information from 1,152 facilities in the aerospace industry that reported releases of these chemicals.

III. Reduce Unreasonable Risks from Marketing and Use of Existing Chemicals

The third OTS goal which I will discuss is the reduction of unreasonable risks posed by existing chemicals.

The Existing Chemical Program differs from the New Chemical Program in several significant ways. First, there is no single triggering mechanism equivalent to the PMN to initiate the review process. Instead, an intensive screening process is used, relying on data from a wide variety of sources.

Second, in the New Chemical Program, priorities are set by a statutorily mandated 90-day review period. EPA must review each submission very rapidly to comply with that deadline, and

therefore reviews PMNs on a first-in-first-out process. In the Existing Chemical Program, priority setting becomes a major management challenge because there is a universe of 65,000 for EPA to evaluate. Program managers must determine priorities among chemicals of potential concern, often without adequate data being available.

Third, the New Chemical Program deals with chemicals that have not yet entered commerce; consequently, the near-term economic and social impact of regulation is inherently limited. However, the Existing Chemical Program deals with chemicals that have well-established and often major roles in the economy. To responsibly place significant restrictions on the use or manufacture of chemicals basic to the operation of the American economy requires EPA to perform extensive analyses of options and impacts. This same level of analysis is not required in the New Chemical Program. Likewise, because we are often dealing with existing chemicals that are used in large volumes and consequently can result in exposure to large numbers of people, greater care must be taken to consider health and ecological effects at low levels of exposure and to analyze most of the pathways that can contribute to exposure. The focus of the Existing Chemical Program on remedial action rather than prevention as in the New Chemical Program means that the quality and quantity of analysis needed to support a decision will always be high.

In order to regulate existing chemicals, TSCA requires EPA to make a determination that the manufacture, distribution, processing use or disposal will present an unreasonable risk to health or the environment (as contrasted to the may present unreasonable risk finding required under TSCA sections 4 and 5).

In order to determine that a chemical poses an unreasonable risk, EPA must determine that the risk is substantial and that the cost of the remedy is more than offset by the benefits of the reduced risk.

Once this determination is made, section 6 of TSCA allows a broad range of remedies. EPA may:

- 1) Ban the manufacture, import, processing or distribution
- 2) Limit the amount manufactured, etc.
- 3) Ban or limit the amount for specified uses
- 4) Indirectly compel recycling of substances or products containing those substances or
- 5) Prohibit or otherwise regulate any manner or method or use of disposal of the substance.

The first independent action taken by EPA to ban a chemical substance under section 6 was the case of chlorofluorocarbons (CFCs). In 1978 EPA acted to ban the manufacturing and processing of CFCs for use as aerosol propellants, except where they were essential, and banned the distribution of those products in commerce. This action was taken in coordination with the Food and Drug Administration, which banned many of the uses that were not regulated under TSCA.

In 1979, we issued an advanced notice of proposed rulemaking to ban the manufacture, importation, and processing of asbestos and asbestos-containing products. This was followed by a proposed rule in 1986. The final rule is expected to be promulgated in the next several months.

EPA proposed a rule in March, 1988 that would prohibit the commercial use of hexavalent chromium-based water treatment chemicals in new and existing comfort cooling towers. The proposal also would prohibit their distribution for use in comfort cooling towers. EPA is taking this action because it has determined that these chemicals are potent carcinogens in humans that pose an unreasonable risk.

EPA also has the authority to issue SNURs under TSCA section 5(a)(2) on existing chemicals. An existing chemical listed in a SNUR is generally subject to the same statutory procedures as those required under TSCA's PMN rule for new chemicals. To date, EPA has issued 10 SNURs on 19 existing chemicals. One of these chemicals, methyl n-butyl ketone has been used as a solvent with aerospace applications.

It often occurs that all or some portion of chemical risks occur in settings such as workplaces, or arise from certain types of products, such as consumer products, to which other Federal health and safety laws may already apply. While TSCA provides EPA with broad authority under Section 6 to control commercial chemical risks and fill potential gaps left by these other laws,

Section 9 of TSCA also contains key provisions designed to ensure that TSCA supports and augments the work of other Federal agencies concerned with public health, safety and the environment. In some instances, EPA, acting under Section 9(d), will communicate its concerns and share information it has developed with another Agency at an early stage of its analysis of risk management options. Such was the case in 1986 when EPA publicly communicated to OSHA its concern for the potential cancer risk posed to apparel workers by formaldehyde that is off-gassed from fabrics treated with durable press resins. In December, 1987, OSHA significantly lowered the permissible exposure level (PEL) for formaldehyde in U.S. workplaces by issuing a health standard that now regulates the chemical as a potential human carcinogen. In other instances, EPA has completed its assessment of the potential benefits and costs of risk management options, decided that certain activities pose unreasonable risk, and, acting under Section 9(a), formally referred the matter to another Agency determined likely to have sufficient authority to adequately reduce or eliminate the risk. In 1985, EPA referred a finding of unreasonable risk to OSHA regarding then current manufacturing and use practices involving 4,4'-methylenedianiline (4,4'-MDA)--a chemical used in the aerospace industry for fabricating advanced design composite materials. OSHA agreed with EPA's characterization of the risk and initiated negotiated rulemaking, in which EPA participated,

to establish a workplace health standard for this chemical.

To ensure coordination of risk assessment and risk management activities in occupational setting, OSHA, NIOSH, and EPA have jointly formed the "ONE" committee. The ONE committee meets regularly to coordinate projects where there may be overlapping responsibilities and activities between agencies.

IV. Remove Unreasonably Risky Substances from Continued Use

The final goal of the OTS program which I would like to discuss today is the removal of unreasonably risky substances from continued use. These Agency actions require the "retrofit" of certain chemicals in use rather than allowing these chemicals to be used for their normal life cycle. To date, our activity in this area has been related to the regulation of polychlorinated biphenyls and asbestos.

Regulations have been developed under TSCA that cover a wide range of regulatory controls for PCBs. We have developed standards that restrict their use, disposal and transportation. Rules have also been developed to minimize the risks associated with PCB transformer fires, a policy statement has been issued to provide guidance on PCB spill clean-ups, and rules are being developed to require the manifesting of PCBs to allow more complete control of these wastes.

EPA has long been working to control exposure to asbestos. We also have a long-standing and substantial technical assistance

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program, as well as a financial assistance program to help schools deal with this very difficult problem in schools. Regulations have been developed that require that public and private schools be re-inspected for asbestos. If asbestos is found, standards have been developed to help schools determine whether a significant problem exists and how to deal with the problem.

EPA is also investigating the best approach to effectively control exposure to asbestos in public and commercial buildings. And in addition, rules are in place to protect previously unprotected asbestos abatement workers.

Conclusion

In closing, I would like to say that TSCA is a unique and effective tool to protect human health and the environment. Today, society is safer because of our new chemicals program and existing chemicals are better managed because of our efforts. TSCA's information gathering authorities are today being used to create, collect and make available to the public the vital information needed to assess risk. We have come a long way, but we recognize that we have a long way to go to fully achieve all of our goals.

In this testimony I have attempted to provide a description of TSCA, and particular areas where we have used TSCA to focus on chemicals used in the aerospace industry.

The Office of Toxic Substances reviews on the order of 2,000 PMN submissions each year. We review each submission based on two principal considerations: the extent of human or environmental exposure, and whether a hazard concern exists for the chemical in question. When the combination of these two factors lead us to the conclusion that a chemical may present an unreasonable risk, we have not hesitated to take follow-up action. And, our follow-up has resulted in almost 10 percent of all PMN submissions either being withdrawn, or followed-up by EPA with a 5(e) or 5(f) order which impose controls.

With existing chemicals, we have a much bigger problem. There are almost 65,000 chemicals in commerce. Many of these have production volumes over a billion pounds, and for many others, millions of people are exposed. However, we have developed many exposure and health based screening tools to help us narrow this universe to a manageable size.

As a result of our screening of these 65,000 chemicals in commerce, we have taken control action under TSCA, or we have referred the chemical to another part of EPA or to another Agency which is better suited to control risks from those chemicals. We have determined that some chemicals, notably asbestos, are best regulated by TSCA section 6. Two major chemicals used in the aerospace industry, formaldehyde and 4,4'-MDA, were referred to OSHA under section 9 of TSCA, and either have been

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(formaldehyde), or will soon be (4,4'-MDA), regulated to control risks resulting from worker exposure.

Mr. Chairman, that concludes my prepared statement. We will be pleased to answer any questions you and the other members of the Subcommittee may have.

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STATEMENT OF
LEO CAREY
DIRECTOR, OFFICE OF FIELD PROGRAMS
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
U.S. DEPARTMENT OF LABOR
BEFORE THE
SUBCOMMITTEE ON TOXIC SUBSTANCES, ENVIRONMENTAL OVERSIGHT,
RESEARCH AND DEVELOPMENT
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

March 6, 1989

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to discuss the activities of the Occupational Safety and Health Administration (OSHA) to protect employees in the aerospace industry. As the Subcommittee has requested, my statement will address OSHA's role in responding to reports of worker safety and health hazards and the implementation and enforcement of the agency's Hazard Communication Standard. I will also comment briefly on OSHA's investigation of the Lockheed Company's facility in Burbank, California.

I will begin by describing OSHA's overall responsibility for workplace safety and health. OSHA was established pursuant to the Occupational Safety and Health Act of 1970 (OSH Act). This statute grants the agency broad authority to promote the safety and health of employees on the job. The OSH Act authorizes OSHA to promulgate occupational safety and health standards and to conduct inspections to enforce those standards -- by issuing citations, proposing monetary penalties, and requiring employers

to abate hazards. The OSH Act gives the agency additional authority to prevent occupational hazards through a variety of means that assist employers and employees in reducing the dangers present in their workplaces, such as providing for training and education, and encouraging cooperative employer-employee programs.

The OSH Act encourages the States to conduct their own federally-approved job safety and health programs. The States maintain inspection forces and operate safety and health programs that are required to be at least as effective as the Federal program. OSHA monitors the States' programs carefully to ensure their effectiveness.

At present, twenty-three States and jurisdictions, including California, have OSHA-approved programs for both private-sector employees and those who work for State and local governments. Two other States, Connecticut and New York, operate partial programs covering only State and local government employees. For the last year and half, California has enforced its program only in the public sector -- that is, for State and local government employees. Private-sector coverage in the State reverted to Federal OSHA on July 1, 1987, after a dispute between the Governor and the State legislature over funding. The issue has now been resolved, and plans are underway for the State to resume full enforcement responsibility for private-sector employment in California by the end of the fiscal year.

Before I describe OSHA's inspection at the Lockheed plant, it would be helpful to outline for you our basic inspection procedures and to explain the two approaches the agency uses to select worksites for inspections.

OSHA Inspections

OSHA inspections are almost always conducted without advance notice, although there are special circumstances under which OSHA may give notice to an employer, as, for example, when notice is required to assure that the employer and employee representative or other personnel will be present. An OSHA inspection begins with an opening conference at which the compliance officer explains the purpose and scope of the visit. An authorized employee representative is given the opportunity to attend the opening conference and to accompany the compliance officer on the inspection, along with the designated representative of the employer.

The compliance officer and the employer and employee representatives then proceed through the establishment to inspect work areas for safety or health hazards. On an inspection tour, which may cover part or all of an establishment, employees are consulted and interviewed. During the course of the inspection, the compliance officer points out to the employer any unsafe or unhealthful working conditions and discusses possible corrective action.

The compliance officer also examines records of deaths, injuries and illnesses which the employer is required to keep, as

well as any records of required monitoring of employee exposure to toxic substances and harmful physical agents.

After the inspection tour, the compliance officer holds a closing conference with the employer, and the employee representative. It is a time for free discussion of problems and needs. The compliance officer explains all apparent violations for which a citation may be issued or recommended, and informs the employer of his or her appeal rights. When appropriate, more than one closing conference may be held. This is often necessary when health hazards are being evaluated or when laboratory reports are required.

After the compliance officer reports his or her findings, the Area Director determines whether citations will be issued and penalties will be proposed. Citations inform the employer and employees of the regulations and standards alleged to have been violated and of the length of time set for their abatement. For three days or until the violation is abated (whichever is longer), the employer must post a copy of each citation at or near the place where the violation occurred.

OSHA proposes penalties for alleged violations according to their severity, which may range from other-than-serious to willful and repeated. A penalty of up to \$1000 may be proposed for each instance of a serious violation that is cited, and up to \$10,000 for each instance of a willful or repeated violation. Upon receiving a citation, the employer must correct the cited hazard by the abatement date unless he or she contests the

citation or the abatement date. Contested cases are heard before the Occupational Safety and Health Review Commission, an independent adjudicatory body. Commission rulings may be appealed to the appropriate U.S. Court of Appeals.

Scheduling of Inspections

OSHA uses two approaches in selecting worksites for inspection. The first is a programmed or targeted approach in which OSHA determines from available data the industries and activities where hazards are most likely to exist. During fiscal year 1988, Federal OSHA conducted more than 58,000 inspections of which approximately 28,000, or 48 percent, were programmed. The second approach in selecting inspection sites is unprogrammed, in which the agency responds to: employee complaints of alleged hazards; reports of fatalities, catastrophes, and imminent danger; news media accounts of accidents or other workplace safety and health problems; and referrals by other government agencies. Most of OSHA's unprogrammed inspections are occasioned by employee complaints of alleged hazards. In fiscal year 1988, the agency conducted more than 12,000 complaint inspections.

Programmed safety inspections in the manufacturing sector are targeted to those industry segments with lost workday injury rates that are above the national average of 3.4 (lost workday injuries per 100 full-time workers) for all industries, as estimated by the Bureau of Labor Statistics. The agency has separate systems for targeting safety inspections at mobile work sites such as construction and maritime operations, both of which

have higher lost workday injury rates than the manufacturing sector. To ensure that no employers are exempt from programmed inspections, five percent of targeted safety inspections in manufacturing are conducted in low-rate manufacturing workplaces, and another five percent are conducted randomly in non-manufacturing industries. Health inspections are targeted to industry segments with a history of serious health violations on past OSHA inspections.

Complaints

Section 8(f) of the OSH Act requires OSHA to investigate all formal complaints -- that is, signed complaints from employees or their representatives alleging that there is an imminent danger or that a violation of OSHA's standards threatens them with serious physical harm. To ensure confidentiality, the agency will withhold the name of the employee.

OSHA typically responds to formal complaints within one day for imminent danger situations and within five days for potentially serious hazards. The agency may take up to 30 days to respond to formal complaints that are judged to be other-than-serious. In general, OSHA limits its complaint inspections to the specific hazard covered in the complaint, but may expand the inspection to other areas if there is evidence of additional workplace hazards.

In the case of non-formal complaints -- that is, oral complaints or those which are received from individuals other than employees or their representatives -- OSHA ordinarily

responds by sending a letter to the employer. The letter describes the nature of the alleged hazard, and asks that the employer reply to OSHA in writing about the action taken to abate the hazard. If the employer's response is not received or is judged to be inadequate, the agency may conduct an onsite investigation of the hazard. Employers are directed to post copies of OSHA's letter and all related correspondence at the workplace until the case is closed. OSHA provides the complainant with copies of all relevant correspondence and notifies the complainant of the employer's report on the action taken to correct the hazardous condition. The complainant has the opportunity to inform OSHA if the employer does not correct the hazard.

OSHA's Inspection of the Lockheed Facility

The Subcommittee has asked OSHA to discuss its recent investigation of the Lockheed Company's facility in Burbank, California. The agency first became aware of the concerns of Lockheed employees from two formal complaints filed by workers about conditions at the plant. The first of these complaints alleged that there was inadequate ventilation to remove fiberglass dust and particles in an area where aircraft parts were being fabricated. The second concerned hazards posed by fluorescent light fixtures that were not provided with covers, and a wall outlet that was reported to have caught on fire.

OSHA also learned of press reports alleging health problems from exposure to chemicals used in certain research and

development projects at Lockheed. According to these reports, workers were experiencing adverse health effects, which were said to be associated with workplace exposure to harmful chemicals. Among the health effects reported were: headaches, memory loss, personality changes, high blood pressure, and sinus and other respiratory problems. The news media also reported that an unusual number of plant workers had developed cancer.

On September 29, 1988, an industrial hygienist arrived at the Lockheed plant to investigate the two employee complaints and the recent press reports of widespread health hazards. This compliance officer is a member of OSHA's special Health Response Team and has masters' degrees in environmental science and occupational health.

As is usual on complaint inspections and media referrals, the inspection was limited at first to the areas involved in the employee complaints and the press reports. When the industrial hygienist observed apparent safety hazards in these areas, he made arrangements to have a safety compliance officer assist in the inspection. Two additional compliance officers with special expertise in examining injury and illness records joined OSHA's inspection team to conduct a review of Lockheed's recordkeeping practices. To date, OSHA has devoted almost 2,000 employee-hours, or more than 250 work days, to inspect the Lockheed plant. I should note that OSHA received full cooperation from Lockheed, the Air Force, the unions involved, and individual employees.

As part of the inspection process, the compliance officers interviewed union officials and about 250 employees and former employees at their homes, as well as at the worksite. The industrial hygienist took more than 200 air samples to measure the levels of chemical and dust exposure in the work area so that OSHA could determine whether its standards were being met.

OSHA completed the onsite phase of its inspection on January 31, 1989, when a closing conference was conducted with plant management and union officials. The inspection team discussed the results of its inspection, including areas where citations might be issued. OSHA expects to release its findings soon. Until then, we are unable to discuss the specific results of our inspection.

Health Standards

One of OSHA's primary concerns is the effective protection of employees exposed to hazardous chemicals. OSHA estimates that at least 32 million employees in every type of industry are exposed to chemicals at work. Chemical exposure can result in a wide variety of health effects, ranging from simple headaches to cancer. Most of these effects are preventable if exposure is controlled or avoided.

The agency enforces comprehensive standards for chemical substances, several of which, such as asbestos, benzene, formaldehyde and lead, are used in the aerospace industry. These comprehensive standards include provisions for exposure

monitoring, medical surveillance, engineering controls, education and training, and recordkeeping.

OSHA also has established permissible exposure limits for about 600 industrial chemicals and substances. In a recent landmark effort, the agency set limits for 164 substances that had not previously been regulated by OSHA, and adopted more protective limits for 212 chemicals. Employers in all industries except construction and maritime will be required to meet the new limits by September 1, 1989. OSHA expects to extend the revised limits to the construction and maritime sectors after a separate rulemaking.

In the event that a chemical substance is not addressed by an OSHA standard or permissible exposure limit, OSHA can issue citations for alleged violations of section 5(a)(1) of the OSH Act. This section, known as the General Duty Clause, requires employers to furnish employment and a place of employment free from recognized hazards that are causing death or serious physical harm.

Hazard Communication

The Hazard Communication Standard is a generic regulatory approach to ensure that hazard and protective information is available to all workers exposed to any potentially hazardous chemical product. The standard is based on the premise that workers have both a need and a right to know the identities and hazards of the chemicals they work with, as well as how to protect themselves.

When the Federal rule first went into effect in May 1986, it applied only to manufacturers. In August 1987, OSHA extended it to all industry sectors, and since August 1, 1988, has been enforcing it on all inspections in all industries except construction. Because of various court actions, the rule became effective only recently in the construction industry. On March 17, OSHA will begin conducting programmed inspections to enforce the standard in the construction sector.

The Hazard Communication Standard requires chemical manufacturers and importers to evaluate the hazards of the chemicals they produce or import. They must then inform their employees, as well as the employers to whom they ship their products, about the hazards.

Chemical manufacturers and importers must ensure that each container of a hazardous chemical is labeled with the identity of the chemical, appropriate hazard warnings, and the name and address of the manufacturer or other responsible party. They are also required to develop more detailed information, in the form of material safety data sheets, for the hazardous chemicals they produce or import. Manufacturers and importers must automatically provide material safety data sheets to their downstream customers with the first shipment of a chemical, and with the next shipment after the sheet is updated.

Material safety data sheets provide extensive data regarding the chemical, such as its chemical identity and physical and chemical characteristics. These sheets also contain critical

information concerning the chemical's potential health effects, the way it enters the body of the exposed worker, exposure limits, proper protective measures, and emergency and first aid procedures.

Every employer is required to develop and implement a written hazard communication program that includes a list of hazardous chemicals in each work area, to maintain labels on containers, and to obtain and maintain material safety data sheets for the hazardous products in their workplaces. Material safety data sheets must be readily accessible to employees during each work shift.

Most importantly, employers must train their employees to understand the information the standard makes available to them. This information, properly communicated, enables employers and workers to prevent harmful exposures and accidents and deal appropriately with emergencies. Training must be provided to employees at the time of their initial assignment and whenever a new hazard is introduced into the work area. Employee training must address how to read and interpret information on labels and material safety data sheets and how to detect the presence of hazardous chemicals.

Any chemical that poses either a physical hazard (such as flammability) or a health hazard (such as causing damage to the skin or eyes) is covered by the rule. Presently, the standard covers more than 575,000 chemical products and substances found in the nation's workplaces. As new chemicals are introduced in

the workplace and new information about existing chemicals becomes available, producers must update the information they provide to their customers, and employers must update their hazard communication programs.

With the information provided to them under the standard, employers can implement controls to reduce employee exposure and design better protective measures for their workers. For example, employers may decide to substitute less hazardous chemicals for the ones they now use, or may choose appropriate protective clothing to prevent skin absorption of a chemical product. Together, the actions of employers and employees under the Hazard Communication Standard, will result in decreased exposures, and subsequently in a reduction of chemical-source illnesses and injuries.

* * *

OSHA shares the Subcommittee's concern about employee exposure to chemical products in the aerospace industry. As I have noted, OSHA has a full range of programs to help ensure that employers provide their workers with safe and healthful working conditions. OSHA targets its discretionary inspections to high-hazard workplaces and responds to all valid complaints about alleged hazards. The agency has issued standards covering more than 600 individual chemical substances, and, through its Hazard Communication Standard, gives every employee the means to know about the hazards of the chemicals in their workplaces.

That concludes my prepared remarks. I will be happy to respond to any questions.

Not for publication until released by the Committee on
Environment and Public Works
U.S. Senate

STATEMENT OF

MR. GARY D. VEST

DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE
(ENVIRONMENT, SAFETY AND OCCUPATIONAL HEALTH)

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE SUBCOMMITTEE ON TOXIC SUBSTANCES, ENVIRONMENTAL
OVERSIGHT, RESEARCH AND DEVELOPMENT

MARCH 6, 1989

Good afternoon, Mr. Chairman and members of the subcommittee. Thank you for inviting me to testify on the occupational health aspects of advanced composite technology. The Air Force welcomes the opportunity to help clarify this subject.

I will address the occupational health issues from the US Air Force perspective. As you requested, I will discuss the following specific aspects:

- a. Potential worker exposures in connection with Air Force maintenance activities.
- b. Air Force training requirements for workers handling advanced composite materials.
- c. Engineering controls and protective equipment requirements.
- d. The Air Force periodic industrial hygiene monitoring of composite work areas.
- e. The events that led to Air Force sponsorship of the recent conference on the occupational health aspects of advanced composite technology in the aerospace industry.
- f. A summary of findings from the conference.

Before I begin my remarks, I would like to briefly discuss our occupational health program and Air Force dedication toward worker protection. The Air Force is firmly committed to providing a safe and healthful working environment for its workers regardless of location. The Air Force has long had one of the best safety and occupational health programs in the Federal Government, well before the passage of the Occupational Safety and Health Act. We have over 2000 safety professionals; over 600 Environmental Health Officers, Bioenvironmental Engineers, and occupational health physicians; and over 1800 technicians worldwide who are employed full time in providing quality safety and occupational health surveillance of our workplaces. These professionals work closely with State and Federal regulatory authorities and are constantly striving to improve occupational health and safety in the workplace.

The Air Force performs aircraft maintenance activities which have the potential for exposure to the components of composite materials. These potential exposure situations occur in three general locations: at contractor operated facilities, at Air Force Logistic Centers (maintenance depots), and at Air Force installations with aircraft containing composite materials.

Air Force personnel are assigned to contractor production plants for training or contract oversight. They may find themselves in the same areas and sometimes performing the same work as employees in the manufacture of the aircraft. For example, Air Force maintenance personnel are assigned to the

contractor operated facilities to learn repair techniques for composite structures in preparation for delivery of production aircraft. The Air Force recognizes its personnel have potential exposures like those of contractor employees and these maintenance personnel are included in the Air Force occupational medicine surveillance program. We are currently developing and reviewing plans to extend this medical surveillance to other Air Force personnel at contractor operated facilities. We are also evaluating procedures to provide industrial hygiene support to Air Force personnel at contractor operated facilities.

The second Air Force population is composed of military and civilian personnel who will work with composite structure production and repair at Air Logistics Centers. Major depot level repair and modifications are performed on aircraft systems at five Air Logistics Centers. These maintenance activities are supported by large industrial hygiene and occupational health staffs at all five Air Logistic Centers. We perform complete industrial hygiene evaluations and conduct occupational medical surveillance programs.

Finally, we have a limited capability to repair and replace composite items on aircraft at operational flying bases. Maintenance procedures are controlled by Air Force Technical Orders and include proper industrial hygiene precautions. Additionally, each operational base also has assigned industrial

hygiene and occupational health personnel for direct surveillance of all composite material activities.

Training of Air Force employees handling any potentially hazardous material, including advanced composite materials includes, general hazard communication and training for their specific tasks. Our installations have provided training for specific chemicals such as asbestos, and operations such as painting and degreasing, for many years. We are now implementing the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard as codified in 29 CFR 1910.1200. Our implementation is governed by Air Force Occupational Safety and Health (AFOSH) Standard 161-21, Hazard Communication, dated January 23, 1989. This standardizes and expands our previous local training efforts to ensure all Air Force workers who work with hazardous materials, are trained on the hazards of these chemicals.

The main vehicle for training employees is the Federal Hazard Communication Training Program. This program was developed by the Department of Defense (DOD) and other Federal Agencies in cooperation with OSHA. The program which consists of a 90 minute videotape, trainers' guide, and student workbook is at our bases and training has begun, starting with those workers most likely to be exposed.

The Federal Hazard Communication Training Program will continue to be supplemented by locally developed programs on specific hazards or procedures. For example, all Air Force employees who are required to wear respirators receive training on respirator wear and use.

A major source of information for hazardous materials in the workplace is the material safety data sheet (MSDS) which contains information on the chemical constituents, associated hazards, and required personal protective equipment. Although suppliers are required to provide MSDSs to users, the Air Force and other Federal agencies are not afforded the same rights as industry users and must request the MSDS through contractual channels. This places the burden on us as users to ensure receipt of the MSDS, which is then input to the DOD maintained Hazardous Material Information System.

The Hazardous Material Information System contains more than 48,000 material safety data sheet references. In addition to safety and health information, the system also contains transportation and disposal information. This information is accessible to DOD agencies on microfiche. Faster information access will be realized with the availability in June 1989 of this information on compact disk for computer access.

The quality of MSDS information is a major concern. Personal protective equipment and ventilation recommendations are often

nonspecific, assume worst case conditions, and generally are not very useful. Information on the health hazards is often difficult to read and understand by the worker.

To overcome some of the shortfalls in information contained in MSDSs, the Air Force maintains them in the Bioenvironmental Engineering Services (BES) office at each installation. This office is staffed with Bioenvironmental Engineers and industrial hygiene technicians, who routinely monitor the workplace environments, are familiar with the specific workplace operations, and are knowledgeable in hazardous materials handling and toxic effects. The BES personnel explain the MSDS information to the worker and answer worker questions. In addition, the BES personnel have access to the industrial hygiene case files for each industrial shop area. These files contain the results of air sampling results, engineering controls in place, the personal protective equipment required, and narratives of shop activities. This enables BES personnel to fully communicate the hazard to the worker and to identify steps the worker should take to minimize his exposure to potentially hazardous materials.

In addition, specific maintenance procedures are contained in Air Force Technical Orders. These technical orders are step-by-step maintenance and operations manuals which also provide cautions for handling materials and specify proper personal protective equipment. We follow the technical order requirements.

Technical orders may initially be prepared by the weapon system manufacturer and provide a means of technology transfer between the manufacturer and user. The Boeing Company is currently developing a technical order for composite repair procedures under contract to the Air Force Advanced Composite Program Office at the Sacramento Air Logistics Center. The technical order procedures are reviewed by Air Force material engineers in coordination with industrial hygienists at the USAF Occupational and Environmental Health Laboratory.

Technical orders are not stagnant publications. They are periodically reviewed by Air Force health and safety personnel for currency and accuracy of protective warnings. Changes are also identified by field users. These procedures ensure our technical orders reflect the latest in health and safety precautions and procedures.

To ensure that workers are adequately protected, Bioenvironmental Engineering Services personnel evaluate each industrial area on Air Force installations at least annually and more frequently, if necessary. These evaluations include air sampling, review of the process to include hazardous materials handling procedures and determination of the adequacy of engineering controls and personal protective equipment.

Composite material components do not present inhalation hazards except in very few situations. These situations are

recognized and readily controlled with currently available engineering controls such as local exhaust ventilation systems. However, dermal protection to prevent dermatitis, skin sensitization, and chemical absorption may be required. In instances where technical order guidance is unavailable, the Bioenvironmental Engineering Services personnel will continue to work with industry representatives to identify proper protection. This was discussed at our advanced composites conference.

There were several events that led to our sponsorship of the recent conference on the Occupational Health Aspects of Advanced Composite Materials in the Aerospace Industry, February 6-9, 1989 in Dayton, Ohio.

My first awareness of potential problems was in the fall of 1988 through newspaper articles on the west coast, alleging that aerospace workers were being harmed in the workplace by exposures to materials used to build advanced aircraft. At the same time, there was Congressional interest related to the allegations of health problems at the Lockheed facility in Burbank, California, and at the Boeing facility in Washington State. The Occupational Safety and Health Administration (OSHA) was spurred to investigate the alleged problems at the Lockheed location.

Although Air Force occupational health experts generally believed there were no uncontrollable health hazards associated with production of composite structures, the potential for

improper industrial hygiene practices in any industrial chemical process is always present. Therefore, we thought it would be appropriate to have a conference with representatives from the aircraft industry, the chemical suppliers, Government agencies, labor, and the other military services, to review the whole subject of the occupational health aspects of the composites industry. We wanted to ensure that all available information generated about the potential hazards is available for use in protecting Air Force maintenance workers and to identify any data gaps that exist within present knowledge of composite technology.

The Air Force sponsored the conference of industry, labor, Department of Defense, and other Federal Government representatives to:

- Determine what is known, and possibly more importantly, what is not known, about the health effects of composites
- Examine current controls and the effectiveness of these controls in preventing worker illnesses
- Review the need for epidemiological studies on the health effects of composites
- Study the availability of health information to the worker, in the form of training and hazard communication

The conference was extremely successful. Two hundred and seventy professionals met and candidly discussed these issues and made substantial progress in achieving the established objectives.

The overall conclusions of the conference were:

- Composites are a product of our advanced technology which provide a massive leap in performance over the metal parts they replace. They are critical to our nation's security, not only in defense systems but in the commercial product sector as well.
- Rapid development has not always allowed health issues to keep pace with the introduction of specific new systems. However, there is knowledge of the hazards associated with the major individual components and an underlying awareness of the potential health hazards associated with these materials. Development of new composite systems is an evolutionary not a revolutionary process.
- Composite materials can be used and manufactured safely using currently available technology.
- More must be done to inform our workers of the hazards of these materials and precautions to be taken to safely use these materials. In addition to good engineering controls,

the goal must be to develop a safe workplace based upon knowledge of the materials and proper protective procedures.

- Management must be committed to protecting the health of their workers and must communicate this commitment to their employees. This was exemplified in such statements as:

"We want our employees to not only be protected, but feel protected," and

"Plants with good management/employee relations will have less problems than those where relations are poor."

- Epidemiological investigations are not appropriate at this time. These studies will probably be unproductive in establishing a definite cause-effect relationship due to inherent limitations.

- An area of major concern is the apparent breakdown in getting quality MSDS information from the original supplier, through the distributor and manufacturer, to the final user. The MSDS must contain usable and easily understood information. Procedures must be established to ensure health professionals have ready access to proprietary information, to protect the health of the worker. But health professionals must understand their obligation to protect

disclosure of this proprietary information. This is a universal problem, but it is workable.

As with any industry which has experienced quantum leaps in technology advancement, there have been problems in ensuring worker health. However, the overall conclusion of the conference is that the problems are neither unique to these materials nor the aerospace industry, and the problems are solvable with current technology.

I am proud of the progress the Air Force has made in our occupational health programs and the leadership role we took in hosting the national conference on composite technology. We are firmly committed to providing a safe and healthful working environment for all our workers.

This concludes my prepared comments. I will be happy to answer your questions.

March 2, 1989

Ms. Stephanie Clough
United States Senate
Committee on Environment and Public Works
Washington, DC 20510-6175

Dear Ms. Clough:

I am a member of the CIUC (Chemically Injured United Coalition) and would like to relate my own personal experience regarding a company named Coastcast Corporation, a subsidiary of Dupont, which manufactures aerospace parts. My neighbors and I (about 15 families) were subjected to periodic exposure to intense noxious fumes and odors from January 12, 1989 to February 6, 1989. This has gone on for several years, but has recently gotten worse and become more frequent.

On January 18, 1989 at 10 P.M., I personally went to the company, which is less than 100 feet from our home, to complain about the fumes that were making my family ill. I was invited inside by an employee so that I could speak to someone in charge about resolving the problem. On meeting the evening supervisor, who refused to give me her name, I informed her about the severity of the visible smoke and irritating smells coming from the exhaust stacks at the business.

At first she told me that there was "nothing she could do about it," and then when I asked her to call someone else who could, she told me that there was no one she could call, even in an emergency situation. I informed her at this time that the company was "clearly discharging airborne emissions much greater than was allowable by law." She immediately acted in a threatening manner, stating that she was going to have me "arrested for trespassing" as I sought to leave the premises. I told her that

...continued...

I was going to immediately take appropriate measures.

When I arrived home, I called the SCAQMD (South Coast Air Quality Management District) and the LA Fire Department's HazMat team (hazardous materials). The fire department responded and told us that since it was an "odor problem," we should call the AQMD. But by the time the HazMat team had arrived one hour later, Coastcast had stopped its excess emissions. The next day the AQMD representative showed up and said that since there weren't ten families complaining at that time and no odor was evident, he could not do anything.

Since this time, there have been subsequent problems with emissions from the same company, and they have been officially cited twice by the SCAQMD.

I would like to add that although the news media (radio, television and newspaper) covered our situation, the coverage was superficial.

The residents, including my family, who have been seriously affected by the noxious fumes being emitted from Coastcast, cannot afford to get proper diagnosis and treatment from a toxicologist, because the costs would be prohibitive in relation to our incomes. (Medical expenses could be as high as \$2,000/person.) Additionally, if the affected residents had been able to afford the medical care at the time of exposure, there was no record available to us at either the AQMD or fire department as to which hazardous substances were utilized at this plant (clear violations of AB2185/AB2187). How could a doctor diagnose possible health effects from exposure to toxic substances, when there was no immediate way in which to have obtained this information in our situation?

...continued...

Municipal, county, state and federal agencies have done little to assist us to correct the circumstances. Coastcast has failed to fully disclose all of the chemicals used specifically at the Van Nuys plant, and we are in the process of trying to obtain this information from the AQMD. Although two members of our coalition were given a 3"-thick packet of MSDS sheets listing many chemicals by the AQMD, we were told that "these chemicals are used at all of the Coastcast plants." (From the time of the initial report of the emission incident on January 18, it took until February 27 to receive the MSDS sheets. We are still attempting to specifically discover the chemicals used in Van Nuys only, in order to enable us to know what substances we may have been exposed to, which resulted in air discharges from manufacturing processes from the ovens, afterburners and scrubbers at Coastcast.

As stated previously, this company had not, as of the date of this letter, filed proper MSDS sheets and disclosure of hazardous materials with the LA fire department HazMat section (according to AB2185/AB2187).

Members of our environmental coalition have attempted to gather information on this situation. Several of us have spent up to 40 hours a week for over one month making telephone calls (at our own expense) to the various agencies, and have also met with employee representatives of the AQMD.

The AQMD does not respond in a timely fashion to "complaint" calls, which would enable its inspectors to observe physically the noxious emissions by this company. In fact, when the company gets caught, it's as if by chance. It is a strange coincidence that the company temporarily stops operating its ovens and burners immediately before the AQMD representative arrives to investigate in almost every instance. For example, when ten residents called and complained between 5:30 and 6:30 P.M. on February 6, 1989, the AQMD representative

...continued...

Armon Avilla, did not arrive until after 8:30 P.M. stating that he had to 'eat his dinner first." He did not start to collect written complaint forms from residents until after 10:30 P.M., when most of the people were in bed. Then he said later that only three people had called in to complain, even though I had a list of ten different families who had called. When one of our members confronted the AQMD about the "tardy response" on the February 6, 1989 incident, she was told, "We're a complaint line, not an emergency line."

In the meantime, the problems with Coastcast still persist.

The following is a brief listing of the primary health problems that we have in common with our immediate neighbors: Nasal, eye and throat irritation and burning; eczema and hot, itchy skin; respiratory problems; nose bleeds that do not properly clot; mouth sores; and very severe headaches.

Since the emissions from Coastcast intensified on January 12, our pet rabbit and three stray cats in the immediate neighborhood have died. I reported the death of our rabbit to Michael Krauss of the legal department of the AQMD, Friday, the 24th of February. He told us to keep the deceased rabbit wrapped in a plastic bag in our home over the weekend, so that they could perform tests on the body the following Monday. But on Monday, February 27, 1989, we were told by Larry Hopkins of the AQMD, to bury the rabbit because there were no current facilities to do the required tests.

The smell of the decaying carcass was very pungent and caused great distress to my son. He was deeply concerned that no one was going to find out "what killed my pet and that no one was going to do anything to Coastcast for murdering my pet." Our vet stated that the rabbit's immunity is critically lowered from the toxins, since they are more sensitive than humans, and painfully die of heart and respiratory failure as a result. I have enclosed a polaroid photograph of our dead pet

...continued...

-5-

rabbit for your official records.

As our case indicates, there is poor coordination between agencies responsible for the protection of the public, poor agency response time when called out in emergency situations when public health is threatened, lax enforcement of laws when firms are in clear violation of state and city codes. We would suggest that when a firm violates an emission standard, that instead of the "wrist-slapping" that the firms usually receive by the enforcement entities, fines be levied immediately, and that these fines be used to pay for the medical care and diagnosis that is so necessary when innocent victims are exposed to these toxics.

As a citizen of one of the most "kinder gentler nations" in the world, we have a right to clean air and clean water. Our air, land and water and very existence are being threatened by companies that refuse to change processes or eliminate products which in the process of manufacture produce poisons. Either the government cracks down on these companies and informs the public the true nature of the threat, or then I must sadly conclude that the government -- including our elected representatives -- has decided our lives are being traded for the profits of companies.

In closing, I would like to state that it is poor public policy to concentrate factories and corporations contiguous to residences which emit poisonous toxins into the air, and pose grave health threats to nearby residents. It is not only the health and safety of the aerospace workers that are threatened by these companies. Frankly, we are tired of being told everytime there is a toxic accident or spill, "There is no danger to health or no significant health risk to residents or workers in the area." We consider this type of statement irresponsible propaganda.

...continued...

There is only one solution: to stop the pollution and the production of these deadly substances.

Thank you for the opportunity for placing my testimony into the public record. I hope that meaningful action will be put into effect immediately.

Sincerely,

Diane Gail Haggart
7740 Balboa Blvd. Sp 185
Van Nuys, CA 91406

Addendum:

For informational purposes only, I wish to present for the record, that there is another aerospace firm, Marquardt Company, located in close proximity to our home, which stores and uses large quantities of hazardous materials on site; and in the past years, without public disclosure, has incinerated Agent Orange, DDT, UDMH, MMH, Ethylene, Hexachlorocyclopentadiene, and Benzene. Under the Freedom of Information Act, we have requested the Agent Orange Thermal Destruction Study performed at Marquardt circa 1973, but as you can see from the attached letter, we have been unable to obtain the Agent Orange study. (See attached letter from Barbara A. Carmichael, Freedom of Information Manager, Dept. of Air Force)



DEPARTMENT OF THE AIR FORCE
WASHINGTON, D.C. 20330

DEC 1 1988

OFFICE OF THE SECRETARY

Ms. Jody Sparks
Toxics Assessment Group
2609 Capitol Avenue
Sacramento, California 95816

Dear Ms. Sparks:

We are responding to your October 31, 1988 Freedom of Information Act request. We received it on November 17, 1988, from the Office of the Assistant Secretary of Defense.

We have been unable to identify or locate a copy of a USAF report regarding thermal destruction study for Agent Orange, conducted at the Marquadt facility in Van Nuys, CA, circa 1973.

As a result of the class action lawsuit filed in 1979 by Vietnam veterans against the chemical company manufacturers of Agent Orange and the United States, the Department of Defense produced approximately 325 cubic feet of relevant, unclassified documents to the Department of Justice for release to the party litigants. These documents relate to the research, development, contracting, procurement, employment and disposal of Agent Orange in South Vietnam, during the period 1960 through 1978. The document you have requested, if it still exists within the Air Force, may be contained within this collection.

Unfortunately, this DOD Agent Orange document collection, consisting of over 40,000 documents, does not have any detailed master index identifying the documents within the collection. The documents are not arranged by subject matter, nor chronologically. The documents are arranged in batches, with a general index identifying the agency source of the documents within a batch, coupled with a very general description of the documents within each batch. A batch may consist of two or several hundred documents, that may or may not be related to each other, other than the fact that they came from the same source agency. We cannot determine whether the document you have requested is within this collection. Our review of the master index listing did not identify the report you are seeking. We estimate that a page by page search of this collection would take approximately ten to fifteen hours, at a search rate of \$25.00 per hour, with no guarantee we will locate the document.

The DOD Agent Orange document collection is in storage at two locations in Washington, D.C. and in Maryland. If you wish the Air Force to conduct such a search of the DOD Agent Orange document collection, please advise us.

Sincerely,

Barbara A. Carmichael

BARBARA A. CARMICHAEL
Freedom of Information Manager

National Foundation For The Chemically Hypersensitive

A Chemically Induced Immune System Disorder

Post Office Box 9
Wrightsville Beach, NC 28480

Telephone
(919) 256-5391

March 4, 1989

Senator Harry Reid
708 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Reid:

The problems of the Aerospace Industry are not special to them. This toxic exposure is going on in the EPA office building at 401 M St., Washington, D.C., at EPA offices in Atlanta, Ga. and many other locations across the country. In offices, homes and factories, Americans are being permanently injured by toxic chemicals. The problem is toxic chemicals and lack of fresh air. I hope you can help the chemically injured.

Could you support our request for your committee to expand your inquiry to all toxic exposures and also have a GAO investigation of why chemical hypersensitivity and toxic injury has not been properly dealt with so those injured can receive real care.

I sincerely hope you can help keep additional people from being damaged. The Institute of Medicine did a report called, "The Role of the Primary Physician in Occupational and Environmental Medicine". You would not believe how hard it is to find doctors knowledgeable and willing to properly treat.

Call me if there is anything we can do to help. Thank You.

Sincerely,


Fred Nelson

C.C.
Senator John Warner
Senator Jim Jeffords
Senator Max Baucus
Senator Joe Lieberman
Senator George J. Mitchell
Dr. Fudenberg

— A GOOD PLANET IS HARD TO FIND —

Cancer is Not the Worst Illness That is Caused by Toxins • Tomorrow Could Be Cancelled for Lack of Interest



INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE & AGRICULTURAL IMPLEMENT WORKERS OF AMERICA-UAW
 Certified Bargaining Representatives for Boeing Vertol P&M Workers

Local No. 1069

4th & EDDYSTONE AVENUES
 EDDYSTONE, PA 19013
 215-878-0217

Anthony G. Forte, President

STATEMENT BY PRESIDENT ANTHONY G. FORTE, UAW LOCAL 1069
 TO THE UNITED STATES SENATE SUBCOMMITTEE ON TOXIC
 SUBSTANCES, ENVIRONMENTAL OVERSIGHT, RESEARCH & DEVELOPMENT
 MARCH 6, 1989

Good day, Chairman Reid and distinguished members of the United States Senate Committee on Environment and Public Works. On behalf of the International Union, UAW and Local 1069, it is a pleasure to be here and observe this morning's proceedings.

My name is Anthony Forte. I am President of Local 1069, UAW, representing the workers at the Boeing Helicopter plant in Ridley Township, Pennsylvania; just outside of Philadelphia.

Although I am not testifying today, I am here to inform you about the plight of our workers in my local union who are in constant contact with composite agents graphite and kevlar which are used to produce the V-22 Osprey.

Many of our members suffer with headaches and dizziness, skin disorders, ulcerated skin and eye irritations. Although we are not physicians, we fear that these illnesses may be due, in part, to the side effects of resin matrixes found in composite materials used in manufacturing processes. Our concerns over this possible health hazard are such that we could not pass up the opportunity to join with our Brothers and Sisters in the International Association of Machinists union in bringing these problems to the attention of this subcommittee.

As you listen to workers who have had medical problems caused by contact with composite materials, please keep an open mind and remember that these are some of America's most highly skilled workers who are seeking medical and educational information regarding their occupations.

We ask that the committee make some regulations for the disclosure of the information that emanates from these proceedings.

In closing, let me state that we in the UAW are prepared to assist in anyway that we can. A HAZARD-FREE WORKPLACE IS A HEALTHY AMERICA.

opeiu-14/pl

February 27, 1989



Marjorie Wilkerson
Senior Account Agent
15 Oregon Ave #304
Tacoma WA 98409
Bus: 206-474-1521
Res: 206-858-9076

The Honorable
Senator Harry Reid

c/o Sheila Humke
Senate Environment Committee
458 Dirksen Building
Washington, D.C. 20510

Re: Human Toxic Exposure and Victimization

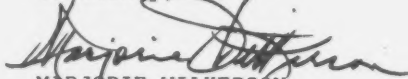
In accord with our telephone conversation this morning, Sheila, enclosed is the information relative to my personal experience.

It is my sincere hope that the committee will recognize how widespread and long-tenanted this problem is in our country. Many people have been striving for more than a decade to achieve right action and enlightenment at great sacrifice and expense.. additional to their pain and suffering and loss of life.

The barriers are so high to truth in these matters that the individual is faced with bankruptcy, loss of job, loss of face, and other tactical maneuvers too frightening for most to want to undertake. They therefore become a "silent victim".

It is on behalf of those victims already silenced, and on behalf of the human condition that follows us that I submit this information to the Committee that they may exercise their power to generate proper care of the people of the United States of America.

Sincerely,


MARJORIE WILKERSON

WILKERSON REPORT TO SENATE ENVIRONMENT COMMITTEE

PAGE 1

Human Toxic Exposure and Victimization

The following two notes make mention of a start at identifying the "others" with similar experiences outside the aerospace industry:

(1) There are many toxic exposure victims in the United States who have now joined together in "networks" to enlighten and support one another. One such group deals only with the "carpet" exposures. I refer you to the following family for more information with their permission:

Mr. & Mrs. Glenn Beebe, P O Box 399086, Cincinnati, Ohio 45239

(2) Through legal actions some of us have come in contact with other toxic exposure victims and have given testimony on their behalf, and subsequently found that there are others who have done the same. I was asked to give a deposition for the Fantel Case in Seattle.

This is my story:

In December of 1981 and again in late February/early March of 1982, I was exposed to toxic agents in my workplace from a new carpet installation (glued down) in our office that was being refurbished. One-and-a-half years later it was discovered that the ventilation had been turned off in the area in which I worked (in 1979), and it has taken the ensuing six years to find out "what" I was exposed to in the way of chemicals.

Prior to the exposures, I was a healthy, very energetic, active individual with no medical treatments for any reason that we can determine from records since 1972. Prior to that time I sustained back and neck injuries in a fall in 1964 for which I was hospitalized and an auto accident in 1969 for which I still treat with a chiropractor.

Immediately after and subsequent to the exposures I developed health problems that include asthma, nerve and brain damage, loss of hair, extreme fatigue, "dryness" that has since appeared to me as cellular damage to tissue, "flu-like" symptoms, aching joints and bones. I have recently been diagnosed as having carcinoma or lymphoma.

The building we were in was found to have major ventilation problems that would require approximately \$100,000 or more to repair. The lease was not renewed and the building has been vacant since the end of 1985.

Fumes from the carpet installations (done in two stages in the building) were sufficient enough that ALL workers complained and experienced some symptoms. None of the windows in the building opened. In response to the complaints, management brought in three commercial fans and placed them at the only three outside doors to vent the building all day each workday for three weeks. We sat in our coats in December to do our work. We were told there was "nothing wrong".

When my symptoms became what I considered serious: numbness around the mouth, slurred speech, fuzzy thinking, I complained further which resulted in serious repercussions. My work condition became a "no-win" situation. I struggled through, seeking assistance, or change.

In the long process I discovered what this REALITY is for a victim:

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Some very fine doctors do recognize the seriousness of this widespread problem. Some can AND WILL diagnose the toxic agent exposure. In so doing they expose themselves to unrelenting pressure from their peers and the legal systems. For every doctor treating for toxic exposure, defendant attorneys can find three who will negate the diagnosis.

For every "expert" who risks revealing the true picture, there are five who will accept the \$250/perhour fee to sign their name to a defendant attorney's pre-prepared "opinion".

Virtually every victim I have met is diagnosed by at least one doctor (usually from Labor and Industries) as being "hysterical", or being the subject of "mass hysteria", and/or is subjected to character assassination attempts.

The victim's peers are interrogated. Their employment records are subpoenaed and combed. Some are followed in their private life and/or "watched" at work.

Sometimes the only way the victim can find out information is to sue: Once that step is taken, the conditions become very serious indeed. Defendant attorneys can postpone cases indefinitely. They have the power and funds to run up astronomical bills by deposing lengthy testimony (for which the victim must pay \$1. or more per page), they have the power to send the victim from one defendant doctor to another, to ask for six or ten or twenty "expert opinions". They have the power to subpoena every or any record on the victim's life they can think might be "useful" to their case. Such as finding that a doctor in 1962 once prescribed valium after the birth of a child, then insinuating the victim probably has a "dependency" problem. It becomes irrelevant that the prescription was never filled. We are the "accused".

Some attorneys abandon their clients half way down the road for various reasons: lack of funds, enormity of the task, difficulty in overcoming the DAVID AGAINST GOLIATH SYSTEM.

There are some remarkable attorneys who have been able to overcome the insurmountable. Most settle for their clients out of court, and with the settlement comes the "gag". You can't tell ANYONE anything about the case, ever.

I have asked myself a hundred times throughout this ordeal: What happened to us in America? What happened to our systems?

It seems so clear that the formulation of standards to protect human life need urgent attention. It is my earnest plea that your committee can bring this about so that future generations may preserve and enjoy the earth's hospitality in good health, sans victimization.

Submitted this 27th day of February, 1989.

ISSUES RELATED TO THE USE OF, AND EXPOSURE TO, VARIOUS CHEMICALS

WEDNESDAY, JULY 5, 1989

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT,
Los Angeles, California.

The subcommittee met, pursuant to notice, at 10:02 a.m., in room 11207, Federal Building, Los Angeles, California, Hon. Harry Reid (chairman of the subcommittee) presiding.

Present: Senator Reid.

OPENING STATEMENT OF HON. HARRY REID, U.S. SENATOR FROM THE STATE OF NEVADA

Senator REID. Good morning.

It is a pleasure for me to be here today in Los Angeles to chair this hearing of the Subcommittee on Toxic Substances, Environmental Oversight, Research and Development. This subcommittee is considering issues relating to the use and regulation of toxic chemicals.

In March of this year, this subcommittee heard testimony in Washington, D.C., from workers in the aerospace industry who presented complaints about their health rising from exposure to various chemicals in the work place.

We heard, for example, from one woman who had passed out due to chemical sensitivity while she was putting gas into her car. The result: after she passed out, gas poured uncontrollably over the ground until someone came to shut it off for her.

We also heard from a young woman who has to wear protective gloves even while asleep because her contact dermatitis brought on by chemical contamination is so severe that her fingertips are sensitive to the slightest contact.

Unfortunately, ladies and gentlemen, there are hundreds and hundreds of stories like these that I just mentioned—stories of ordinary American working people who have become victims of toxic chemical contamination.

The aerospace industry workers who testified in Washington were all exposed to advanced composite materials. Advanced composites are plastic-based compounds mixed with carbon, ceramics, or other synthetic fibers. These materials are lightweight, strong, and resistant to fire and corrosion and can be elusive to radar—

properties that are particularly valuable to our defense industry and our national security.

The advanced composite materials industry is significant. American production of composites reached 2.7 billion pounds last year—an increase of more than 6 percent over 1987. Without advanced composites, building aircraft such as the national aerospace plane stealth, and an economical supersonic transport would be impossible. Obviously, these lightweight, high-strength, hybrid materials are here to stay.

In the near future, composites are expected to replace much of the metal used in automobiles and in aircraft. Such technological advances strengthen our economy and, of course, our national defense.

A representative of Suppliers of Advanced Composite Materials Association, which is an industry trade organization, will be here today to testify about the overall importance of this expanding industry.

Stone-age protections for space-age dangers simply can't be tolerated. I believe industry is working to fill information gaps that exist about the dangers of composites, but the question is: are they working fast enough? More must be done to make sure that information is readily available to all employees. This must be the rule rather than the exception, as it now is in many places.

It is also industry's obligation to ensure that employees are instructed as to the proper handling of chemicals and are provided and required to use appropriate safety gear. In this context, the subcommittee will focus on proposition 65, California's Chemical Warning Law, enacted overwhelmingly by California voters in 1986.

Proposition 65 requires businesses to prove that their products and chemical discharges pose no significant risk. Proposition 65 uses market incentives to reduce chemical exposure.

Witnesses representing the Environmental Defense Fund and the National Resources Defense Council will address the implementation of proposition 65.

A representative of the California Department of Health Services in Los Angeles County will discuss occupational safety and health issues.

Any industry, regardless of its importance, must be safe for workers and the environment. Far too many people—more than 10,000—die each year in the work place, and tens of thousands more are permanently disabled—all from accidents that should never have happened.

Better training and education is the key, of course, in order to reduce and eliminate the hazards that exist. Progress in markets and technology must be matched by progress in worker health and safety measures. Everyone profits when the work place is safe, and everybody loses when it isn't.

Ladies and gentlemen, we have a long list of witnesses today. In order to have time to hear everyone the testimony of each witness will be limited to approximately five minutes, that should leave ample time for questions.

I understand that some of our first panel is not here yet. I see that Randy Fullerton is here.

Randy, would you step forward?

Is Gary Price here?

[No response.]

Senator REID. Mark Gillespie.

[No response.]

Senator REID. I'm sure they will be here.

Would you raise your right hand?

[Witness sworn.]

Senator REID. Mr. Fullerton, you've been sworn. Would you proceed to give your statement?

STATEMENT OF RANDY FULLERTON, NORTH HOLLYWOOD, CA

Mr. FULLERTON. First of all I'd like to say good morning to everyone here. I would like to thank, from the bottom of my heart, the committee for allowing me the opportunity to speak with you today. It has been a long and very painful five years in getting here.

I would like to extend special thanks to the honorable Senator from Nevada, Mr. Harry Reid, and to Ms. Sheila Humpkey. Her compassion and understanding of this situation has been greatly appreciated. Again, my heartfelt thanks to you all.

From July of 1984 to June of 1987 I complained vehemently about the use of toxic chemicals at Lockheed without protective gear being supplied. And just as vehemently about the fact that the labels had been deliberately removed from the cans of solvent that we used, preventing us from knowing what we were using at all. I still do not know to this day what I used, and it has been five years. No MSDS sheets were ever given out.

I complained loud and clear, but nobody listened—not my employers at New West; not Lockheed, who ignored the problem for years; not CAL OSHA, who refused my pleas for help during numerous calls I placed to them in 1984 and 1985; not my own lawyers, who refused to investigate my repeated allegations that others were getting sick at Lockheed.

I can't help but wonder how many workers suffered needlessly over the last five years simply because CAL OSHA not only did not take seriously my complaints, they lied when they said everything was okay at Lockheed. I was told that they were out there all the time and Lockheed doesn't use any chemicals that would hurt anybody.

In the early spring of 1984 I went to work for a company by the name of Western Pacific Crating. This company had a contract with Lockheed to specially seal individual aircraft wing planks and to also build the crates in which they would be shipped. We would then pack these wrapped wing planks in the crates and seal the crates with waterproofing chemicals for shipment.

We worked exclusively on Lockheed property in building A-1, Burbank, California.

After only a month or so, Western Pacific lost its contract. I found out who the new company was—New West Export Packing Company. I was hired in June of 1984.

I would like to take a moment to describe the working conditions, if I may.

A-1, the building in which we worked, is a converted aircraft hanger where the temperature inside was, more often than not, hotter than outside. It was routinely well over 110 degrees inside the building.

The only apparent ventilation system in use was a household fan in front of an open door that did nothing more than draw into the building jet, bus, and auto exhaust fumes.

Inside the building one area was set up for the machines that manufactured the actual wing planks. The air in this section was thick with fumes of grease, oil, and solvents.

In another area were some 15 to 20 paint booths that would spray paint the wing planks, themselves. These booths were not enclosed, but wide open, with particles of paint landing on anything and everything throughout the building. This paint was a special corrosion preventing paint that, once it had dried, would become extremely hard to remove.

This job became our new priority—to remove the paint “overspray” from the hundreds and hundreds of wing planks that had been damaged. This new duty had been assigned by Lockheed.

The first few products we tried were a complete exercise in futility. We were then given cans of a solvent or acid—I still do not know what it was at this time—that removed the paint with very little effort at all. The labels from these cans had either been deliberately removed or had never been put on in the first place.

I cannot stress this point enough. Not one of the 20 to 25 cans of this product we used over the next couple of weeks had labels of any kind on them. This product was stored upstairs in building A-1 in a refrigerated metal box that was also unmarked.

The product was extremely hard to use. As soon as you opened a can, you would all but be knocked over by the fumes. They were the strongest of any I had ever encountered.

One day I went upstairs to see if I could search out and find a can of this product with one label on it. I could not.

Almost immediately I began asking for protective gear, i.e., goggles, gloves, respirators, etc. None had been provided.

Right from the start I experienced severe headaches and dizziness. Lockheed's own inspectors would not come within 20 feet of us when we were using this product. My symptoms increased daily. They included: nausea; vertigo; headaches; dizziness; loss of energy; chest pain; cold, then tingling, then numbness of the hands and then feet; and memory loss.

As the symptoms increased over the next couple of weeks, so did my pleas for protective gear. None came until almost the end of the third week of our continual usage. We were given some goggles for our eyes, some dust masks for our nose and mouth that did absolutely nothing to prevent the fumes from getting through, and some big, thick, black, industrial-type gloves that I thought would help until we used them. The solvent ate through the gloves in a matter of two to three minutes. The parts of the gloves that came in contact with the solvent would just disintegrate.

That night after work I could literally taste this product in my mouth very strongly as if I had taken a drink of it straight from the can. My girlfriend at the time even noticed it, pushing me

away and asking me in no uncertain terms what the blank I had in my mouth when I kissed her good night.

The symptoms had increased in severity each day during the last three weeks and had stayed with me longer and longer each day after work, as well. The symptoms would subside less and less as each day passed.

The next day at work we decided to try the gloves again, but it was obvious they were completely worthless. We must have gone through some 30 to 40 pairs in about an hour and a half of use.

After about an hour I started to pass out from the fumes and was grabbed by my coworkers, who took me to Lockheed nurses station, where I was given oxygen for about 20 minutes.

Not feeling any better, I was then taken to a medical clinic used by New West Export and Crating.

The doctor then told me to take a couple of days off and avoid the fumes when I returned to work.

I attempted this, but it was impossible.

They sent me to the doctor. This began what will soon be five years of sheer blank in dealing with inept lawyers and unjust workers compensation and Lockheed's denials.

And now to see that not only did OSHA find Lockheed guilty of everything I have been saying for almost five years, but it goes far beyond that, sir. It goes to the contamination of the ground water to where Burbank had to close their wells, and it contaminates the whole East Valley. Numerous other cities had to shut down parts of their wells, also.

It also has been reported that Lockheed is also the second leading air polluter in the Valley, releasing some 303,000 pounds of cancer-causing PCE into the air.

I've then got a small section on the workers' compensation.

Senator REID. We have a number of questions to ask you, if you would remain seated.

We now call forward Mark Gillespie.

Mr. Gillespie, please raise your right hand.

[Witness sworn.]

Senator REID. Please proceed, speaking as loudly as you can.

STATEMENT OF MARK GILLESPIE, LA CRESCENTA, CA

Mr. GILLESPIE. Ladies and Gentlemen, my name is Mark Gillespie.

I was an aerospace worker for Lockheed for nine years from 1979 to 1988. Unfortunately, I will probably be an unemployed and injured aerospace worker for the rest of my life.

I have been contaminated with over-exposures from toxic chemicals in my work place. Some of these chemicals are new developments in this industry, and just as many are old ones that are quite common. What is even more disturbing to me is that some of these older, more common ones in use are ones that you, our government, has banned or made illegal, such as MEK and some types of asbestos. Of these chemicals and substances, some are only legal for use on government projects or by the government. I would like to know why. How can you say a substance is banned or illegal but we can still use it?

Of these new ones such as phenyl epoxy or graphite composites, I find it utterly ridiculous that I and other average, Joe Blow citizens off the street can gain secret security clearances and top secret security clearances for government projects, but company doctors, OSHA-officials, Congressmen, Senators, and union representatives are constantly and will probably continue to be denied access to work areas.

Health records, MSDSs, and work process records are not available to people under the guise of security clearance and need-to-know projects.

Also, because of these conditions and circumstances, I, myself, have witnessed extensive clean-ups and sterilizations and cover-ups before on-site inspections.

I would also like to know why the waste from these secret materials that nobody can get clearance to see are packed in small barrels, labelled in Spanish, and sent to Mexico for waste disposal.

I know there are people here today from companies that make and/or distribute composite materials, and they are undoubtedly going to hand out miles and miles of paperwork and statistics that will try to explain how safe and nonthreatening these materials are, but these people are not working or living in the real world.

As you well know, being in the government, paperwork and statistics can be made to say anything you want them to, but I, as many other people in the audience today, know that the real world of these chemicals is a world of severe headaches, rashes, nerve damage, liver disease, lung damage, cancers of every kind, depression, and constant worry of what it will do to me and my family in the future.

Until workers are properly trained and protected and companies are forced to strictly adhere to stringent regulations governing the use and manufacture of these old chemicals and toxic substances—new and old, alike—the defense workers that have built this nation into the most powerful nation on earth are left with no defense at all to protect themselves.

Large fines are not the answer because, unfortunately, you, the government, do not live in the real world, either. You fine these people millions of dollars, and then you turn right around and fine them for willful neglect, you let them pay the fine, and then you take the willful neglect out of the charge. In the real world, this is selling the workers and the American public down the river.

If a company is found in violation of Federal worker safety or environmental safety laws, they should be shut down until such time that it is determined that they are in compliance with such laws and no plea bargain of charges.

In closing, I would like to thank you for allowing me to speak my mind here today and would like to ask for your help to make the aerospace industry and other industries safe from misinformation on safety and safe from the people and companies that are only interested in profit and not worker safety.

I would also like your help in keeping this nation from becoming a country of the corporations, by the corporations, and for the corporations.

Thank you.

Senator REID. Is Gary Price here?

[No response.]

Senator REID. Gary Price not being here, I will proceed with questioning of this panel.

First of all, would you both tell me your age?

Mr. FULLERTON. I'm 33.

Mr. GILLESPIE. I'm 29.

Senator REID. How old were both of you when you started to work at Lockheed?

Mr. FULLERTON. I was 28

Mr. GILLESPIE. I was 19.

Senator REID. Tell me what your job was? You described it, Mr. Fullerton, but in laymen's terms, what did you do?

Mr. FULLERTON. My situation is somewhat unique in that I worked for a company that was contracted to Lockheed to do a specific job, and that was to package and special waterproofing—package wing planks for shipment throughout the country and world and to build the crates in which these wing planks would be shipped.

That was technically my job to start with.

Senator REID. Where did all the fumes come from, then, if that's what your job was?

Mr. FULLERTON. Well, the building, itself, was full of fumes and paint spray from—

Senator REID. Even though you didn't use them?

Mr. FULLERTON. Right. Correct.

Also, sir, I would like to add that my exposure to the fumes came when Lockheed decided that they had had enough of the overspray—the paint landing on all the parts in the wing planks that were due to be shipped. They then came up with these chemicals to use to take this—again, it is an anti-corrosive paint, so when it dries it is extremely hard to remove. They gave us these chemicals which took the paint off without any problem at all, and that job, as they had a rush contract in, lasted for the last three and a half weeks or so of my employment before I passed out. This was done six to eight hours a day.

Senator REID. How long did you work there?

Mr. FULLERTON. With two different companies, I worked for approximately six months.

Senator REID. Mr. Gillespie, tell me how long you worked for Lockheed and what you did.

Mr. GILLESPIE. I worked there for nine years—almost ten years. I did several things, mostly in the plastic industry part of it, and also on final line assembly.

Senator REID. What did you do, though?

Mr. GILLESPIE. I was a bonding assembly senior. Other than that, I can't really tell you other than I mixed several substances for putting on aircraft, or I made certain parts, fabricating them from raw materials and chemicals, and prepared final line aircraft for shipment to the government.

Senator REID. And during this period of time that you worked, did you work with liquids?

Mr. GILLESPIE. Yes.

Senator REID. And did there come from—

Mr. GILLESPIE. And then solids.

Senator REID. And from these products were there fumes emitted?

Mr. GILLESPIE. Yes. Yes. There were quite a lot of fumes, and no telling what kind. In fact, some of them would give off fumes you couldn't even smell. It wasn't until we brought a law suit that we all found out how dangerous they were.

In the building or buildings that I worked in, there was virtually no ventilation. There was one sanding booth that went directly to outside with nothing more than flimsy paper filters. There was only one exit door, no windows, and I think there were 15 circulation fans—floor fans—that would blow the dust and fumes around.

More so than the fumes, probably, the dust contaminants that we were breathing in were probably the most dangerous things that there were.

Senator REID. Mr. Gillespie, you heard Mr. Fullerton talk about his girlfriend, how he kissed her and she complained that he had a funny taste.

Mr. GILLESPIE. Yes. My wife did, also. I complained about a metal taste in my mouth. My wife also said that my body was emitting the smell, and when she would kiss me or, quite frankly, when we would be intimate, she could taste and feel and smell the metal or what she described as "wet cement" smell and taste coming from me. I have actually had pure silver underneath my skin where I would go outside and the sun would turn it orange. I would go inside and it would go away. I would go outside and it would turn it orange again. It is a photochemically reactive substance, I guess.

There are so many things. You wear rubber gloves and sweat inside the rubber gloves and your hands turn orange like they were rusty.

Since I have been away from there, almost all of these problems have gone away. My headaches have gone away. The tingling and numbness in my hands and feet have not because that's nerve damage and it will never go away. They are numb right now.

The rash that I have on my arms and my back are still there. They come and go. If I put gas into my car they flare up. If I clean the floor in the kitchen they flare up. No matter what I do or what chemical I work with—at one time, when I was working with a particular substance called AF-333, which was a four-part phenyl epoxy mix, I had a chest cold. My wife rubbed Vicks Vaporub on my chest—a harmless thing. Well, it wasn't harmless to me any more because I broke out with blisters like somebody had burned me with a cigarette all over my body.

It became to the point where it wasn't only my physical health, but it was my mental health. I had to get away from there.

Senator REID. Why did you leave?

Mr. GILLESPIE. I couldn't take it any more. I couldn't take being lied to. I couldn't take the company managers telling me and everyone else that we were crybabies. I couldn't take any more—nothing was being done. On the outside they are saying, "We're doing this and this and this. We're helping you out." And on the inside what was actually going on was "procedure as normal." It just kept going on.

Senator REID. How long have you been away from that employer?

Mr. GILLESPIE. Since October 14 of 1988.

Senator REID. We heard from Mr. Fullerton about which building he worked in. Which buildings did you work in?

Mr. GILLESPIE. I worked in buildings 310, 311, 83, 363, 351, and 199.

Senator REID. Was any of your work considered classified activity?

Mr. GILLESPIE. All of my work was considered classified.

Senator REID. What about you, Mr. Fullerton?

Mr. FULLERTON. Not to my knowledge. No.

Senator REID. What is the status—and you can both answer this question—of your medical and compensation claims?

Mr. GILLESPIE. Who knows? It has been going on for four years, and we still know nothing more than we did four years ago.

Mr. FULLERTON. I would like to answer that, if I may. My case was started in August of 1984. For the next three years I complained loudly to Lockheed, to CAL OSHA. I called CAL OSHA begging for help. None came.

I went to a lawyer who a friend of mine suggested. In seven months I didn't hear from him again. I went to another lawyer, and didn't hear from him again for a year. I went to another lawyer and had the same type of thing.

I was finally coerced into settling my case in June of 1987 after three years of complaining loudly, thinking that I was the only one in the country that this was happening to. I have been told this by my lawyers, I have been told this by doctors, I have been told this by CAL OSHA.

I settled my case after suffering a severe spine injury on another job a year later. I had lost my home. I had lost my car. I had to move back in, at 28 years of age, with my mother. I was rear-ended in an automobile accident about a year after that and ruined her car. I had to settle my case to get some money to continue my life. I had lived on the street before my pride allowed me to go back home again. I was forced on the street because of doctors and the workers compensation system cutting off your measly benefits any time they feel like it for whatever reason they choose. I lived on the street because of this.

My case has been settled, and I want to find out if there is any way I can get it overturned because I was the only one in the country, I thought, that was going through this until November.

Senator REID. How much did you settle your case for?

Mr. FULLERTON. For \$10,000.

Senator REID. Mr. Gillespie, are you working now?

Mr. GILLESPIE. No.

Senator REID. Why is that?

Mr. GILLESPIE. Plain and simply, I would have liked to stay in the aerospace industry. Since I am on medical leave from Lockheed, I am considered an employee for two years. If I go to work anywhere, that drops my workers compensation benefits or unemployment benefits. And, to be quite frank, I don't know where I would go to work where I wouldn't be exposed to some sort of chemical.

I am an auto mechanic. I can't do that any more. Every time I work with something it makes me break out and makes me sick. No matter what I do.

Mr. FULLERTON. That's a very important point. Everything that has a chemical additive of any kind in it—using white out to prepare this report made me sick. Anything that even emits some kind of odor that may be chemical is enough to make us sick.

And it is not mental. Contrary to Mr. Paratore's testimony earlier at the previous hearing, this is not a situation where we get depressed and anxious first and then developed these symptoms in our mind. This is a situation where these symptoms came along from exposure to fumes and chemicals and then we got severely depressed and anxious.

Senator REID. During your employment at Lockheed, were either of you informed by the company—and, Mr. Fullerton, I understand you were not employed by Lockheed, but you worked for someone else at Lockheed—were either of you informed by anyone about the chemicals with which you were working? And was there any specialized training?

Mr. FULLERTON. None. It was so ridiculous it is scary. They would give us these chemicals, as I said, in unlabelled cans, unmarked cans. We didn't know what the heck we were using. We had no idea. I begged them to let us know what we were using. This stuff was killing me. I knew it from the beginning. "Please tell me. Give me some protective gear." None was coming. We were told, "It is on the way. It is on order." And weeks would go by.

Senator REID. And you, Mr. Gillespie?

Mr. GILLESPIE. No. The only time that we were warned, finally, was in 1985. We had already been working with this substance, AF-333, for about three months. We had literally taken baths in this silver paste. All of the sudden one day they brought out a paper and said to read and sign it. We read it. It said, "This is to certify you have been trained, you have been warned on the use of AF-333. If it so much as gets on your skin you are to report to paramedics to have it washed off and go to Medical."

We'll, we all worked there long enough to know that they do not bring out a report like that unless somebody has gotten hurt and they are trying to protect themselves. That's when we started working for MSDSs and what have you.

Senator REID. Material Safety Data Sheets?

Mr. GILLESPIE. Yes. And they were locked up in the office. We are not allowed to go in the office. We had to rely on supervisors to go get them for us at their own convenience. They were very busy, too, but it was like they were being kept from us.

And then, when we did get MSDSs, we would get three or four MSDSs on that same product, like AF-475, which is a bonder. I have seen—I have in my possession four different MSDSs for the same thing, and none of them make any sense. All the MSDSs—all the stuff that I worked with, or most of it, was made by Lockheed, itself. All these things on there have things listed as "unknown." "Exposure limits: unknown. Reactions of overexposure: unknown." Well, if they're going to make them, why don't they test them?

Senator REID. Were both of you union affiliated?

Mr. FULLERTON. No, sir, I was not.

Mr. GILLESPIE. I was, but I wasn't union represented, because the unions can't even come in there.

Mr. FULLERTON. The unions were no help at all.

Mr. GILLESPIE. When the unions found out about it they said, "No, we don't want anything to do with it." until the time I came out in a newspaper in Seattle, Washington, on the very day that the union was having a convention in Seattle, Washington, and then they jumped on the bandwagon, "We're doing so much." I don't see how they could do so much. They don't even know what the problem is.

Senator REID. Why do you say they don't know what the problem is?

Mr. GILLESPIE. They don't care. They're holding hands with the company. If the company says it is safe, then the union says it is safe. Without the company, there would be no union, so why do they want to force the company to do anything?

Senator REID. Were either of you ever instructed not to disclose or describe the substances you were working with when you talked to your physician?

Mr. GILLESPIE. Yes.

Senator REID. And who, Mr. Gillespie, instructed you?

Mr. GILLESPIE. We were instructed very subtly with flyers from management and security. "Remember, you cannot say anything about your job. You can't say—" We were told constantly for years. We didn't find out until three years into the lawsuit that the materials that we worked with were not classified or were not strictly classified. Only the use, what they were used in, how they were mixed, what they were used with, and what they were used on was classified. So we were mislead.

We were supposed to have—I was a bonding assembly senior. We were supposed to have a physical every six months. Well, in five years that I was a bonding assembly senior I only had two of them, and because Lockheed's doctors aren't cleared to know what we're doing, we went over there and we were classified as asbestos painters, not bonding assembly seniors, so they are testing us for asbestos exposure instead of chemical exposure.

Senator REID. When you worked, what was your work schedule? Did either of you work overtime?

Mr. FULLERTON. Occasionally, yes.

Senator REID. How about you, Mr. Gillespie?

Mr. GILLESPIE. Yes, sir. When I first started working there, we were working 7 days a week, 12 hours a day.

Senator REID. And for how long approximately did that continue?

Mr. GILLESPIE. A month to two months.

Senator REID. And after that you still put in quite a bit of overtime?

Mr. GILLESPIE. Only a few of us, and usually only two hours a day.

Senator REID. Mr. Fullerton, how were you paid? Were you paid well?

Mr. FULLERTON. No, I was not. I was paid hourly.

Senator REID. How much?

Mr. FULLERTON. I was paid \$5.50 an hour.

Senator REID. How about you, Mr. Gillespie?

Mr. FULLERTON. I was paid \$14.62.

Captain Lynn Johnson of the Burbank Fire Department, who is in charge of keeping track of all the toxic hazardous materials that are used in industry in Burbank, has gone on record as saying that Lockheed has a terrible, poor history of mislabeling cans, deceiving the people what they're working with.

Mr. GILLESPIE. That was very common in my building, too. We would find bottles that were supposed to have MEK in them that had MIBK in them or had alcohol in them or all three substances mixed together. More than twice I was instructed by supervision to take numerous baskets full of squirt bottle containers that were contaminated or mixed and dump them down the toilets. I said, "Where are we going to dump these things? We don't have a place to dump them." They said, "Go dump them down the toilet."

Mr. FULLERTON. They dump it straight down the sewer system and an open drain in the building.

Senator REID. One of the questions that I am concerned about is these inspections that would come periodically. I don't recall which of you testified, but one of you testified that the facility would be changed prior to the inspectors coming in.

Mr. GILLESPIE. Yes. Most definitely.

Senator REID. Give me as much detail as you can in that regard.

Mr. GILLESPIE. Well, they expected an on-site inspection right after—I'm not sure of the date, but it was right after the ground-water supply was suspected to be contaminated. Lockheed came out as saying, "We haven't used—" I don't remember if it was TCE or PCB "—since 1966." Well, that very day I and another man were sent with a two-wheeler behind my building to remove two 50-gallon drums of TCB from the area and bring it over to the truck and they hauled it off. Where it went, I do not know. But it was an out and out lie.

We didn't have OSHA inspections for two years from I believe 1984 to 1986, or it was 1986 to 1988. But whenever anybody would come in inspecting the facility, whether it be for safety or a sales pitch or whatever—but generally safety—we had to dust everything, we had to spray everything off, we had to make sure that the fans were going. And whenever they would bring them in, we would not have any articles in the building.

It would be in our down time. We were not under working conditions. We were working in clouds of dust, but when the people would come in this place is as pristine as a hospital. They would cover up everything. They would hide everything. They would move it to other buildings. You could just see it.

It was like a game. It was a big joke with us. As the people went to this building, they would get a call on the phone. The stuff from that building would come to our building. When they would be headed for us, it would go from our building over to this building that they had already been into. It was a show game with all the stuff that's not supposed to be there.

And then, when OSHA finally did come in, Emil Gonzalez of the Health Response Team for OSHA out of Salt Lake City, Utah, when he finally did come in, what was his statement to me? I was telling him we worked with this and did this. "I can't do anything

about the past. All I can do is what is now and in the future." Well, the past is hurting me.

Mr. FULLERTON. That past is killing us.

Senator REID. You've heard Mr. Gillespie's statement. Were you ever aware, Mr. Fullerton, of any inspections that took place?

Mr. FULLERTON. Oh, yes. There were military inspections through at least once a month, and the same type of thing happened all the time—every time.

In regards to the groundwater Mr. Gillespie speaks of, the groundwater under one of Lockheed's plants contains 14,000 parts per billion of TCEs and PCBs.

Senator REID. How do you know that?

Mr. FULLERTON. It is quoted in the paper by the EPA.

The legal drinking limit is five parts per billion. That is a heck of an increase.

Senator REID. Mr. Gillespie, you indicated in your testimony something that I am interested in, also, and that is putting materials in containers—

Mr. GILLESPIE. Yes. I know what you're going to ask.

Senator REID [continuing]. Marking them in spanish, and then they would leave. Do you have any basis for that statement?

Mr. GILLESPIE. Well, in our facility you have to be an American citizen to get a security clearance. In the building that I'm talking about, building 83, it is one of the only buildings that has a purification system where the air is sucked into the ground through vents, filtered through water, and then sent out through other vents.

The water in the bottom becomes sludge of urethane material, all different types of MEKs, paints. The paint that they use—often that I use—quite often has arsenic in it. Some of the foams we used have cyanide in them. It is all filtered right down through there and becomes a black sludge.

They have millions of barrels that are—I don't know, but I would guess 10 gallon barrels.

Senator REID. Millions of barrels?

Mr. GILLESPIE. Well, I'm exaggerating. I mean they have stacks and stacks of empty barrels.

Senator REID. Would there be thousands of barrels?

Mr. GILLESPIE. There could be. Yes. These barrels are yellow topped and black sided and they have yellow stickers on the side of them that say "Barrel de salvago" in Spanish. They do not say anything about Lockheed.

I have seen them pump these barrels full of the sludge from the bottom of this purification system, stack them in a corner of the building, and then at night, after everybody leaves or the night shift is in, they load them into a truck. Where they go, I really do not know. I have never been on the truck when it reached its destination or anything like that. To my knowledge, it wouldn't have to be labelled in spanish if it was going anywhere in the United States. Rumors from workers that did know where it was going say that it is going to Mexico.

Mr. FULLERTON. They would store these cans, as well, full of solvent and other materials right out in the sun—110 degrees, and these cans are bulging like footballs. They have had more incidents

since the OSHA fines and violations have come out in May and June where the cyanide gas and other gasses have been released by these composite materials, and twice in two days building 199 was evacuated recently.

Senator REID. We had a hearing last March in Washington, and at that time we had a panel of women testify alleging a number of physical maladies that they had as a result of working in the Boeing and Lockheed facilities.

One woman, for example, testified that her thought processes were impaired, and she gave an example of where she was driving with one of those expandable sun screens still in the windshield. People were honking at her and drawing her attention to something being wrong, and she drove for a considerable period of time until she pulled over and still couldn't figure out what was wrong and someone told her that she had that thing over her windshield.

We had another woman who testified as to how she irrationally dealt with her family.

There were a number of other instances.

In your experience, have either of you had any occasions where your mental capacities were impaired?

Mr. GILLESPIE. Every day still yet.

Senator REID. You seem to be doing well today. On what do you base that?

Mr. GILLESPIE. Well, number one, this is something that I very strongly believe in, but I have been away from there for six months. My wife could tell you, if you brought her up here right now, that in the time that I worked for Lockheed I was very irritable. One minute I would be tired and fatigued, and the next minute I would be snapping at her for no reason. I would be ready to absolutely strangle my child or whatever. It comes and goes with no—I can't remember anything. She tells me one thing—it is quite common that husbands and wives tell each other things and you forget, but it comes to a point when it is not funny any more and it is a serious problem.

There were times when I would go to work at Lockheed and not remember how I got there. I knew which way I drove because I drove the same way every day. But I could not remember for the life of me how I got there. I didn't know whether I was late. I didn't know whether I was early. I didn't know what time I got up. I didn't know how I got there. That's very disturbing.

Right now, even as I read—I'm reading my own words right here, and I missed one page, I jumped over sentences. I'm thinking of a million things right now to say and I can't get any of them out.

Senator REID. Mr. Fullerton.

Mr. FULLERTON. I concur 100 percent. It is almost as if the things you take for granted—normal walking down the street, walking, talking, and chewing gum—is now a chore. It doesn't come naturally. It is not instinct any more. It is something that you have to concentrate on almost just to accomplish a simple goal such as that.

I agree 100 percent where you lose your memory and short-term memory loss where you go to do something and forget what you're doing and go to drive somewhere and not remember the drive or be

driving somewhere and have your hands go completely numb and not be able to feel the damn steering wheel.

Senator REID. Thank you both very much for your testimony. Is Mr. Price here?

[No response.]

Mr. FULLERTON. May I ask one question?

Senator REID. Yes.

Mr. FULLERTON. Is there any possibility of trying to—I have called OSHA numerous times to find out if there is any way to find out what the heck I was exposed to, and I'm told no because there is litigation. This is five years, and I'm still being told I can't find out what I was using. Is there any way that somebody can help me find out what the heck it was I was using?

Senator REID. We'll look into that.

Mr. FULLERTON. I appreciate it very much.

Senator REID. You have given me a large folder entitled "Lockheed Workers and the Environment." Is this for the committee to consider?

Mr. FULLERTON. Yes, if you choose to.

Senator REID. It will be made part of the file of this hearing.

Mr. FULLERTON. At the end of the opening statement I gave you there is a color chart dealing with the sections of the—

Senator REID. I have reviewed that.

Gentlemen, thank you very much.

Mr. FULLERTON. Thank you.

Mr. GILLESPIE. Thank you, sir.

Senator REID. The next witness will be Mr. J. David Forest, President, BASF Structural Materials of Charlotte, North Carolina, on behalf of SACMA, Suppliers of Advanced Composite Materials Association.

[Witness sworn.]

Senator REID. Please proceed with your testimony.

STATEMENT OF J. DAVID FOREST, PRESIDENT, BASF STRUCTURAL MATERIALS, CHARLOTTE, NORTH CAROLINA, ON BEHALF OF SUPPLIERS OF ADVANCED COMPOSITE MATERIALS ASSOCIATION

Mr. FOREST. Thank you, Senator Reid, for the opportunity to testify to the subcommittee on the use of advanced composite materials in the aerospace industry. My remarks today are on behalf of the Suppliers of Advanced Composite Materials Association known as SACMA, the industry trade association.

SACMA has about two dozen member companies who are engaged in making the fibers, the matrix polymers, and the prepreps that collectively are called "advanced composite materials."

Senator REID. What are prepreps?

Mr. FOREST. Prepreps are preimpregnated materials, an intermediate form of composites.

Our customers include the companies who fabricate components for aircraft and aerospace systems, and who are represented by the AIA trade association. The companies in SACMA are predominantly chemical and petro-chemical companies including, besides BASF,

the DuPont Company, Shell Chemical, Amoco, Hercules, Ciba-Geigy, ICI, Hexcel, and a number of others.

Advanced composite materials usually combine the properties of high strength and high stiffness, low weight, corrosion resistance and, in some cases, special electrical properties. This combination of properties make advanced composites very attractive for aircraft and aerospace structural parts.

The materials are used in considerable quantities, as well, for golf shafts, fishing rods, tennis rackets, racing car bodies, bicycles, medical X-ray tables, robot arms, and racing yachts.

In the past 20 years, these new materials have come from the laboratory stage to a rapidly-growing new industry employing some 20,000 people making the materials and the parts and generating sales of well over \$1 billion in 1988.

My prediction is that the use of these materials will continue rapid growth well past the year 2000, at which time some 750,000 people will be involved in a \$30 billion per year industry.

I'd like to underscore the importance of these materials to our defense by pointing out that they are used in substantial quantities on today's modern aircraft such as the F-15, the F-16, the F-18, and the AV8B. In addition, the B-2 stealth bomber and the new ATF fighter designs are irrevocably committed to using advanced composites for essentially the entire airframe.

Advanced composites are widely considered to be one of the key technologies for the future, along with superconducting materials, advanced ceramic materials, biotechnology, and artificial intelligence. In addition, the leadership role of the United States advanced composite industry is also unquestioned, and is one of the bright spots in the current controversy about U.S. competitiveness, in general, and high technology competitiveness specifically.

I'd like to address now the subject of advanced composite materials in the context of their danger to worker health. I do not believe that advanced composite materials are inherently more dangerous to worker safety than metals, but I do recognize that the dangers between these two types of materials are very different, and that workers need help in understanding how to safely deal with composites.

The suppliers of advanced composite materials long ago recognized the need to help our customers understand worker safety health concerns with these materials. To that end, working through SACMA, the suppliers began collecting and summarizing existing data on health effects and recommended precautions from their member companies in 1986. By the way, that was less than one year after the association was formed.

The resulting compendium, in the form of a health effects white paper, was published early this year and has been made available to the subcommittee.

In addition, SACMA and AIA have formed a joint task force to look at health effects, safety procedures, and engineering controls necessary to minimize worker exposure risk to health dangers in using advanced composites.

The genesis of the concerns about health effects in using advanced composites was two widely-reported cases in the aerospace industry, one at a Boeing facility and one at a Lockheed facility.

These two recent cases are of great concern to both the composite material industry and to the aerospace industry.

Were these two instances just aberrations? Or can we expect more such instances around the world? What caused these workers' symptoms? What can be done to minimize the chances of future problems?

The Suppliers of Advanced Composite recognize our obligation to help resolve these questions, and are willing and able to work both with our customers and the government to provide information, to fund research, to adopt new procedures, or whatever else is required to ensure that our high-performance products are safe for use.

Thank you, sir.

Senator REID. Thank you very much.

One of the things that is currently pending before Congress involves the United States working with Japan to build a Japanese fighter plane. You're familiar with that?

Mr. FOREST. Yes. The FSX.

Senator REID. Part of the agreement is that they are going to help us with composites—"they," the Japanese. Frankly, we know more about composites than they do. Wouldn't you say that, as a representative of your industry?

Mr. FOREST. I would say that that's basically correct, not that the Japanese are stupid about composites; they are not. They are very knowledgeable, but not to the practical extent of the United States.

Senator REID. As you observed in your testimony, the aerospace industry is presently the dominant consumer of advanced composites. It is my understanding they are also in limited use in many other items—and you have mentioned some as sporting goods and automobiles. To your knowledge, are workers in other manufacturing facilities free of the illnesses that have been described to us here today? Or are the problems simply less visible because there are fewer people involved?

Mr. FOREST. I am not aware of any other instances that resemble the Lockheed and Boeing cases in other industry.

Senator REID. It is quite clear from the testimony we have received here today and in March in Washington that the amount of composite materials used in, for example, manufacturing of the stealth bomber is decided, as you have indicated in your testimony also, more by performance than cost; is that true?

Mr. FOREST. That's correct.

Senator REID. And so in these defense-related industries, the use of these materials is heavy?

Mr. FOREST. Very heavy. Yes.

Senator REID. You state that SACMA and AIA have formed a task force to consider worker health effects and safety procedures.

Mr. FOREST. That's correct.

Senator REID. And I assume the objectives of this task force are to continue the use of composites, and to possibly increase the use of composites, and in so doing have a safe work place; is that right?

Mr. FOREST. That's correct. It is to examine all of the paperwork, procedures, and engineering ventilation procedures and controls and other kinds of actions that can be taken to ensure that the risks are minimized.

Senator REID. Mr. Forest, do you or does this group that is being formed plan on doing any independent research?

Mr. FOREST. We are not at the stage yet where we have made that decision; however, I think most of us believe that any independent research that is done would probably be most effectively done by an independent body such as a university or an independent research lab.

Senator REID. Certainly, as far as you are concerned, this is something that should be done also; is that not true?

Mr. FOREST. I think there are areas where research is called for.

Senator REID. This subcommittee is charged with a number of responsibilities, but one of the things we learned in our March hearing from representatives of the Federal Government is that there are some 65,000 chemicals used in the work place, of which the Environmental Protection Agency has only tested at most probably 200 of them. As far as testing the mixture of various chemicals, that is almost nonexistent. It just hasn't been done.

Mr. FOREST. Yes.

Senator REID. Are you aware of that?

Mr. FOREST. I am aware of that testimony, and while I cannot vouch for the exactitude of the numbers, in general I think they are probably in the ball park.

Senator REID. So, as I have indicated, there are a number of issues that emerged clearly from our March hearing, but one involved the difficulty posed by the use of multiple substances in the same manufacturing facility.

At present, our health standards are not designed to take into account low-level exposures to many different substances, and we don't have good information on interactions that take place.

The point that I am making and that was made at the March hearing is that any one of these substances used alone may not cause problems, but people don't know what effect a combination of these substances may have. What toxic effects it causes. Are you finding that is a problem affecting the research?

Mr. FOREST. Yes. That is one area of research for which there is not a large body of evidence. And, in fact, one of the first tasks of the joint SACMA/AIA committee is to look for examples—perhaps outside of the traditional chemical industry—for health effect studies for combinations of chemicals.

Senator REID. Mr. Forest, one of the things I would be concerned about: does SACMA have the resources to cofund research by an independent entity on health effects? For example, let's say a university got a grant of X number of dollars. Is SACMA at all able at this time to cofund a research project?

Mr. FOREST. It is very difficult for me to answer that. SACMA, itself, has very little money. Our budget is \$500,000 a year for everything. However, our member companies are all extremely large companies, chemical and petro-chemical companies, and working through SACMA the member companies could make contributions which would substantially provide funds for research.

Senator REID. Mr. Forest, I appreciate that. One of the problems that I see—and we do this all through government—is that in an effort to save money we do projects like we just talked about here. And while it may be as valid as the sun rising every morning, it

may not look valid. The fact being: if you have industry involved in this research, no matter how hard people would try to keep it above board, people looking at it would say it couldn't be valid because such and such company participated in it.

I think this is an obligation that the Federal Government should have; that is, to fund research into these programs. Frankly, there is no incentive for the private sector to do it. They are for-profit companies and there really isn't a great incentive for them to conduct this research, themselves. Would you agree that this is something the Federal Government should be involved in?

Mr. FOREST. I would certainly advocate that, and primarily for the reason of integrity of the data, as you mentioned. I think there is good reason for such research to be done, and I think private industry does recognize that there is good reason for such research.

Senator REID. But, Mr. Forest, again—and you've already agreed with me, but just to emphasize the point—if one of the major aerospace companies did research in this field, I'm not sure it would be accepted.

Mr. FOREST. I'm quite sure that there would be problems of acceptance, much like the tobacco company research.

Senator REID. Thank you very much for being here today.

Mr. FOREST. Thank you.

Senator REID. Is Mr. Meyerhoff here?

[No response.]

Senator REID. The next panel of witnesses will be: Mr. Robert Harrison, a physician who is Chief of the Occupational Health Surveillance and Evaluation Program, California Department of Health Services.

Mr. Harrison.

[No response.]

Senator REID. Well, it is a good thing this isn't a court. We'd have a lot of people in contempt today.

We will then call, out of order, Ms. Diane Fisher from the Environmental Defense Fund.

[Witness sworn.]

Senator REID. Please state your name and proceed with your testimony. Prior to beginning your testimony, would you tell me what your professional occupation is and what your professional background is, education included?

**STATEMENT OF DIANE FISHER, STAFF SCIENTIST,
ENVIRONMENTAL DEFENSE FUND, OAKLAND, CA**

Dr. FISHER. Yes. My name is Doctor Diane Fisher. I am a Ph.D. chemist by training. I have a Ph.D. from the University of California at Berkeley. I am a staff scientist with Environmental Defense Fund.

The Environmental Defense Fund is a national, nonprofit organization with 100,000 members nationwide. EDF's West Coast Office, along with several other groups, played a leading role in the drafting and passage of California's innovative toxic statute, proposition 65.

The main points of my written testimony, which I'd like to highlight in my oral comments, are as follows—

Senator REID. We'll make your full statement a part of the record.

Dr. FISHER. Thank you.

Permissible exposure level limits, as established by OSHA, which limit the concentration of hazardous chemicals in the work place, are grossly inadequate to protect workers from a significant risk of cancer or birth defects.

OSHA hazard communications standards, commonly known as "Right to Know Legislation," will often fail to warn employees of the significant risks posed to them by carcinogens and agents which cause birth defects.

And California's proposition 65, which has already been very successful in reducing marketplace exposures to toxic chemicals via consumer products, has the potential to substantially strengthen work place right to know standards.

Table one in my testimony supports my first point, which is that permissible exposure limits are grossly inadequate to protect employee health. As shown in this table, the amounts of carcinogens allowed in the work place often exceed the amount which causes a significant risk of cancer by factors on the order of 1,000, and sometimes by factors as large as one million.

Senator REID. Would you please repeat that for me.

Dr. FISHER. The amount of chemicals, these carcinogens, which have been estimated to cause a significant risk of cancer are exceeded in the work place—or at least are allowed to be exceeded by the permissible exposure limits—by factors ranging anywhere from 1,000 to one million. That means that the amount of chemical in the work place can be up to one million times higher than the amount which causes a significant risk of cancer.

In fact, some of the earlier testimony highlighted the fact that these permissible exposure limits may not even adequately protect against acute effects like dizziness, nausea, and some of the other effects that previous testimony has addressed.

Unfortunately, OSHA's hazard communication standard is not adequate to communicate to workers the significant cancer and birth defect risk which they may run. The main reason for this is that the levels which trigger warnings under the hazard communication standard are not health-based; they are based on the percentage of the carcinogen or other chemical in the product.

OSHA has interpreted the rules to say that a product must contain at least 0.1 percent of a carcinogen before there is a required warning about cancer. But for many, carcinogens are very potent—for example, dioxin—and it is quite possible that workers will be exposed to amounts of these carcinogens which will pose them to significant cancer risk without even being required to give a warning.

This is in sharp contrast to California's proposition 65. Proposition 65 requires that when, in the course of doing business, a business exposes any individual to an amount of a carcinogen which poses a significant risk, they must provide that individual with a warning. That is for carcinogens which have been listed under proposition 65.

The burden of proof is also shifted to industry under proposition 65, if it wishes to escape the warning requirement, to demonstrate

that the amount of carcinogen to which it is exposing individuals, including workers, does not exceed a level which poses a significant risk; otherwise, they are required to warn.

Proposition 65 also shifts the burden to employers to assure that the warnings are actually effective. You have heard testimony this morning that often the warnings are not effective. The material safety data sheets are often not provided; if they are provided, they are often not clear.

Under proposition 65, an employer's warning requirement is not fulfilled unless they can demonstrate that the warning has actually been accomplished; in other words, that the message has gotten across to the worker about the cancer or birth defect risk which is posed to them by the chemical in the work place.

Proposition 65 also contains provisions for fines, daily fines as long as the business is in violation, and to provide enforcement by citizen suit. This means that even if a violation has been occurring for—the longer a violation occurs, the more financial liability in the form of fines the business accrues. So this gives businesses an incentive to become self-policing and to provide effective warnings about cancer risk before any enforcement action is brought.

Proposition 65 has been very successful in reducing toxic exposures in the market place because although it only requires warning, it gives businesses a powerful incentive to actually reduce toxic exposures rather than warn potential customers about the cancer or birth defect risk that might be posed by their product.

We know of several examples of businesses that have reformulated products to avoid the use of proposition 65 carcinogens rather than be obligated to warn customers.

Reducing the use of these toxic materials will also help reduce work place exposures in these industries.

In sum, we believe that the application of proposition 65 warning requirements, which are health-based and which provide employers with incentives to become self-policing in advance of enforcement, will substantially strengthen work place right-to-know standards. We, therefore, intend to—the State is currently trying to avoid including proposition 65 standards in its state OSHA plan. We intend to continue to endeavor to get the State to include those standards in the State plan, and we strongly urge that such an approach be considered for Federal warning requirements in the work place, as well.

Thank you.

Senator REID. Tell me about your organization. How old is it? What is its aim in life?

Dr. FISHER. The Environmental Defense Fund was formed in 1967. It was formed by a group of scientists at the State University of New York at Stony Brook, I believe. It was formed over concern about DDT contamination in the environment. Many of the scientists who founded EDF were concerned about effects of that toxic chemical in the environment, and so that was the issue around which the Environmental Defense Fund was formed.

We currently have 80 professional staff members, including scientists, lawyers, and economists, in six offices nationwide. We work together to try to propose solutions to some of the environmental problems facing us today.

Senator REID. How is it funded?

Dr. FISHER. It is all private, charitable contributions. About half of it is individual donations; the other half is charitable foundations.

Senator REID. You have heard the testimony this morning, have you not, of these workers?

Dr. FISHER. Yes, I have.

Senator REID. Is their testimony relative to their complaints in keeping with chemical over-exposure?

Dr. FISHER. Yes. It certainly sounds that way. And, in fact, as I said, it appears that the standards of permissible exposure limits either are not being enforced or are inadequate even to protect against acute effects such as dizziness and nausea.

Senator REID. Doctor Fisher, one of the things that we found is that there are very few physicians that are trained and/or willing to take cases that deal with chemical exposure. Is that a fact? Or do you know?

Dr. FISHER. I wouldn't know.

Senator REID. I would think it would be something that your group could look into. For example, in the State of Washington, where Boeing has a very large facility, we had to search to find a physician that would testify about taking care of these patients because most of these workers went to places where either the doctor says they don't take these cases or they simply don't identify their problems because they are not in the textbook, so to speak.

I think this would be a project that some group should look into.

Dr. FISHER. I definitely agree.

Senator REID. Is it something you think you might get your group to look into?

Dr. FISHER. Well, I'll certainly think about it. It is certainly something that ought to be done. It is clear that these workers are experiencing some pretty severe health effects, and clearly there is a need for physicians who can treat those workers.

Senator REID. You heard each of the workers testify that they had trouble finding a doctor. In fact, one man testified he went to three separate doctors.

Dr. FISHER. Yes.

Senator REID. All of them telling him there was nothing wrong with him.

Dr. FISHER. Yes. That is clearly a problem that needs to be addressed.

Senator REID. Proposition 65's objectives, at least the way I understand it, and certainly the intent seems straightforward, simply seeks to provide basic exposure information to workers and the public about potential hazards associated with chemical substances. Secondly, it seeks to prevent dangerous chemicals from being discharged into our water supply. Do you believe, at least in theory, proposition 65 may provide a useful model for a similar Federal program to help overcome the inertia that has characterized the implementation of the Toxic Substances Control Act?

Dr. FISHER. Yes, I do believe that proposition 65 would provide a useful model for Federal legislation and, in the context of worker exposure to chemicals which may pose risks to their health, I think one of the greatest strengths of proposition 65 is that its warnings

and the information it provides are health-based. In other words, whenever chemical exposure is posed as a significant risk to health, the consumer or the worker is provided with a warning.

Senator REID. As compared to what?

Dr. FISHER. As compared to the OSHA hazardous communications standards, which are not health-based. A business is only required to provide warnings to workers about the risk of hazardous substances if those hazardous substances constitute more than 1 percent of a product, 2 percent of a product if it exists as an impurity, or 0.1 percent if it is a carcinogen—at least as interpreted by OSHA. So, in other words, warnings aren't triggered based on whether the worker's health is threatened or not. And, in some cases, the levels that trigger warnings are going to be much, much higher than levels which actually pose health threats.

Senator REID. What has California used as a basis for coming up with the necessary list of chemicals that require labeling?

Dr. FISHER. California has turned to a couple of widely-recognized international bodies which have a great deal of expertise in the area of carcinogenicity. One of them is the International Association for Research on Cancer. The other is the National Toxics Program. Both of those organizations have examined a great deal of the scientific evidence about a large number of chemicals and have made decisions about which of those they believe are carcinogens.

Senator REID. You have given a lot of testimony about carcinogens, but I believe we have to pay more attention to research and regulatory areas concerning non-cancer health effects.

Dr. FISHER. Yes. In fact, proposition 65 does also cover reproductive toxicants—that is chemicals which cause birth defects or other reproductive effects such as infertility, for example.

Senator REID. It is clear from the testimony that we have received in these two hearings—even though today's panel of workers consisted of men and the one in Washington was women—that certainly some of the exposures they have had certainly would fall into that category, would it not?

Dr. FISHER. Yes, I believe they would. In fact, that is one problem with a lot of preexisting toxics legislation: it did not include reproductive toxicants in its coverage. Proposition 65 does.

Senator REID. What about long-term exposure to low levels of neurotoxic substances? Do you believe that they can cause debilitating ailments in low levels?

Dr. FISHER. Yes, I believe that there is evidence that indicates that. Proposition 65 does not cover neurotoxicity.

Senator REID. But certainly the complaints you heard here today dealt with that; is that not true?

Dr. FISHER. Yes.

Senator REID. I'm interested in the selection of the risk threshold to implement proposition 65. Selection of a 10^{-5} level as opposed to the more commonly accepted 10^{-6} threshold would seemingly be difficult to defend. Can you comment on that?

Dr. FISHER. Well, the State of California, in implementing proposition 65, chose to define significant risk as one additional cancer death per 100,000 individuals, or the 10^{-5} risk that you referred to. We do not support that definition since EPA, FDA, and a variety of

scientific bodies have generally defined significant risk as being no more than one additional cancer death per million individuals. However, I think my written testimony makes clear that the amount of chemicals allowed in the work place exceed even a 10^{-5} standard by very, very wide margins. As I said, factors of 1,000, and, in some cases, factors of as much as one million.

Senator REID. I talked a little bit about long-term exposure to low levels of neurotoxic substances. They may produce debilitating ailments that fall outside the traditional infrastructure for handling work place injuries and health problems. I believe that it was the case with the workers from the Boeing facility in Washington, some of whom testified before my subcommittee in March. But shortly after they appeared, their medical claims were dismissed by Boeing, along with those of their co-workers. The Medical Advisory Panel convened by Boeing acknowledged the health problems but could not establish a connection between work place exposure and the most serious problems that workers were experiencing.

The panel suggested, among other things, that anxiety might be causing the problems, and that counselling and therapy could be beneficial. Have you heard of employers suggesting that people's problems were anxiety based?

Dr. FISHER. Yes. I think that happens quite often. There is evidence that low level exposure to neurotoxins can cause a wide variety of symptoms similar to some of the ones described earlier, and I certainly think, rather than just dismissing employees' complaints as stress related, that the possibility that these may be induced by neurotoxicity has to be taken seriously.

Senator REID. We go back to the problem, though, that we have a shortage of doctors that can tie those symptoms with objective findings.

This subcommittee has legislative and oversight responsibility for the Toxic Substances Control Act. Do you have any recommendations for modification to the act to make it more effective? And if you don't at this time, I would appreciate receiving a written communication indicating how you feel this subcommittee could improve that act.

Dr. FISHER. I'd be happy to provide you with a written description of how I think that act could be strengthened.

Senator REID. Thank you very much for your testimony. Is there anything else you would like to add?

Dr. FISHER. Not at the moment. Thank you very much for the opportunity to testify.

Senator REID. We will now call Robert Harrison. It is my understanding that he has arrived. Is that true?

[No response.]

Senator REID. It is not true.

Doctor Paul Papanek, Chief, Toxics Epidemiological Program, Los Angeles County.

[Witness sworn.]

Senator REID. We would also call forward at this time Dr. Neil Moyer, the Director of the Rules Development of the South Coast Air Quality Management District here in Los Angeles, California.

[Witness sworn.]

Senator REID. Doctor Papanek, would you give your name and your professional occupation and educational background?

STATEMENT OF PAUL PAPANEK, CHIEF, TOXICS EPIDEMIOLOGICAL PROGRAM, LOS ANGELES COUNTY, LOS ANGELES, CA

Dr. PAPANEK. My name is Paul Papanek. I am a physician employed by the Los Angeles County Department of Health Services. I am also a family physician. I practiced as a family physician for about six years before moving into the public health area, which has been about the last five years. I practiced occupational medicine as well as family medicine for quite a number of those years when I was in active private practice.

My job with the county health department at this time is more in the area of environmental toxicology than on an occupational side. The program that I am the chief of for county health has been in existence for about three years.

I am delighted to be here, because in our program we find that we are getting pulled more and more into the occupational side of this field.

Senator REID. Please proceed with your testimony.

Dr. PAPANEK. Thank you.

I would like to start by saying that as a public health toxicologist with the primary goal of working in the non-occupational side, the concept that I keep uppermost in my mind all the time is the concept of dose. In toxicology, dose is everything. But I am getting pulled more into the occupational side because the place where our citizens receive the highest doses are not through air, soil, and water exposure outside the gates of work places, but inside work places. And also, in my years of investigating environmental pollution problems, I have the overwhelming impression that we're never going to clean up our air, soil, and water until we get work places clean. We're just not going to do one without the other because work places really are the source of the environmental pollutants.

In a document that I have provided you, there are a number of details that I won't discuss in detail at this point.

Senator REID. That statement will be a part of the record.

Dr. PAPANEK. Thank you, sir.

This document was prepared about a month ago—and I think the timing is opportune—by a committee of experts in Los Angeles County to look at where the gaps in occupational health and safety surveillance and control are. This group was composed of representatives from academia, from both Federal and CAL OSHA, public health programs, occupational health nursing, industry, and labor groups. I think it was an expert panel.

This subcommittee that convened to prepare the document that I have given you identified four key gaps in occupational medicine surveillance in our county, and I think these are gaps that can be plugged not just by local government, but also by State and Federal agencies, as well.

From this document I would like to stress three key points: first of all, public health activities in the area of occupational safety and health are really way behind other public health areas. When I put

my public health hat on, I know that we do a pretty good job of controlling infectious diseases. We don't do near as good a job at controlling toxic diseases, particularly in work places, and we ought to be able to do better.

Secondly, current expenditures—at least in the State of California—for occupational safety and health surveillance are really fairly small. You may know that CAL OSHA's budget is 50 cents per worker per year. This is the total expenditure in this state for occupational safety and health surveillance. CAL OSHA has recently been reinstated and, in fact, has a somewhat more vigorous program than the Federal program. In my opinion, 50 cents per worker per year could be increased even in a modest way with great gains in worker safety and health.

Finally, I think there are some areas that, again, if I put my public health hat on and say, as a public health person, how would I begin to approach the problems, would I use an enforcement model or would I combine it with a public health model, I would do the latter to a much greater degree than is being carried out now.

The public health model for controlling hazards, diseases, and risks has to do more with surveillance and outreach and education as the first tools that we use. It is an area that really hasn't been done to great effect in Southern California, in my experience. It is an area which, if implemented in a more vigorous way, would, I think, get acceptance from industry. Everybody likes to try the education approach first. In one area where we have been active, which is the area of occupational lead poisoning—and I'm going to comment in just a moment about that—I think it is likely to be effective.

Let me elaborate briefly on the first point about surveillance. There are a number of basic questions to go beyond the example of Lockheed that we would like to know but really don't know. For example, if you asked the question: which are the top ten industries that contribute the highest burden of morbidity and mortality for workers, we really don't know the answer to that, and that's a shame. Do we know the epidemiology of work place risk? We really don't know that. And do we have any agencies which can respond whose job it is to respond to clusters of illnesses? Lockheed, I think, to use the public health term, is an "illness cluster." It is a group of persons in the same geographic and time base frame who have an illness that looks like it is related to a common source or sources.

Who should go and do that investigation? Who should go and carry out that epidemiology? At this point, we really do not have an agency whose mission it is to do that. In the past, as you are aware, NIOSH has carried out that function and I think would be well suited to expand some of their activities to do this again.

Well, what are some solutions? Again, I think beyond enforcement we could do more in the public health surveillance and outreach. We need to do the basic epidemiology. We need to find out where the illnesses are. And when clusters arise, we need to have a way of going in and looking at those clusters early before anxiety begins to set in.

I don't think, Senator, that that has been done even yet with the Lockheed group. We really will never know the answer to if this

cluster of illness is related to anxiety or to chemical A, chemical B, or a combination, until we really carry out the epidemiology. That needs to be done.

Secondly, we need to be sure that workers and employers know that there is such a thing as the hazard communication standard. In our program, we have taken out after lead poisoning in the last year, a disease which frankly ought to have been stamped out. California just made lead poisoning reportable, and in the first year, which was 1987, we received about 1,500 cases of occupational lead poisoning in my county. Well, that was a surprise to me.

As we began to contact those employers and follow up on those cases, first we found that those cases represented probably only 10 percent of the actual burden of lead poisoning, and most employers, particularly small employers, did not even know that there was such a thing as a hazardous communication standard or that OSHA had something to do with that standard.

On an encouraging note, the simple process of making that phone call, making that contact, sending some information, has lead to some important improvements in this one area of lead poisoning. Lots of work places, when we followed up several months later, have gone ahead and educated their workers. We're beginning to see drops in lead levels in some of those work places simply as a result of picking up the phone, making those phone calls, making that outreach, and telling employers you have got to take a few basic, simple steps here. That's all without the enforcement side. I think that's a very helpful and useful model.

Could OSHA or an agency that would be a sister agency to OSHA do that kind of basic outreach, not waiting for problems to be reported in, but aggressively, proactively find the places which epidemiology tells us are high risk, contact those places, and walk in a preventive mode before we have to put the hammer down in the enforcement mode? I think that's a good thing to do.

Finally, it has been stressed already—and I think it is true—that there really is a shortage of qualified professional persons. We need more industrial hygienists in my county, as well as occupational physicians and nurses. Recently, when we began recruiting for a few more industrial hygienists to do exactly this kind of outreach program and started calling some of the universities, some of my friends in industry who occasionally hire industrial hygienists, we were told "Good luck. You'll have to turn over rocks to find industrial hygienists in this county."

We need to be training many, many more. We could swallow up 50 or 100 industrial hygienists a year from our institutions and still—

Senator REID. How many?

Dr. PAPANEK. At least 50 to 100 we could turn out a year just for government and universities, much less industry, to fill the need. However, I am optimistic that with these kinds of approaches we really can make a difference in worker safety and health, and probably, as well, in the environmental side.

Senator REID. Doctor Papanek, if you would remain seated we'd like to have Mr. Moyer testify and then ask both of you some questions.

Mr. Moyer.

STATEMENT OF NEIL MOYER, DIRECTOR OF RULES DEVELOPMENT, SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, LOS ANGELES, CA

Mr. MOYER. Good morning, Senator Reid. I am Neil Moyer. I am the Director of Rules Development for the South Coast Air Quality Management District. I have worked in the area of air quality management since 1973 with the State of California at the California Air Resources Board in Sacramento. I have also worked with the California Energy Commission on energy projects and, most recently, have left the Ventura County Air Pollution Control District where I worked for seven years dealing with enforcement measures as well as rules development, and now am charged for rules development for the South Coast AQMD, which has responsibilities for the four-county area of Los Angeles, Orange, Riverside, and San Bernadino Counties under State and Federal law for air quality management.

As the Senator may be aware, earlier this year our governing board adopted its 20-year plan required under the Federal Clean Air Act to attempt to clean up the air in Southern California to meet the national air quality standards, particularly for ozone or smog.

I should note that one of the largest categories of emission sources in this basin is the use of solvent materials—solvent materials used in commercial products, in consumer products, and industrial settings. These are second only to the emissions from motor vehicles with regard to solvent emissions and ozone-causing pollution.

I should note that the district's experience goes back many, many years in regulating the use of solvents and, in fact, goes back probably to the mid- to late-1950's when the L.A. County Air Pollution Control District implemented what was then called "rule 66," a regulation which then became a model across the country in an attempt to limit or otherwise control the types of solvents that would be used in coatings and other solvent use areas.

One unfortunately side effect, though, of rule 66 and regulations like it was: because it focused on solvents as being precursors to smog or ozone, it preferentially identified other compounds as not contributing to smog or ozone—so-called "exempt solvents." As we found out in the 20 or so years of implementing rule 66 and its successors, some of these exempt solvents, in fact, present hazards that, from an air quality management perspective, pose a "Hobson's choice." Some of these solvents are, in fact, known carcinogens or very soon will be identified as carcinogens. Some of them have effects on depletion of stratospheric ozone. As a consequence, when these solvents are used to substitute for the use of other so-called volatile organic compounds, we end up with a reduction of smog-producing emissions but, on the other hand, we may, in fact, increase the emissions of known carcinogens.

In the air quality management plan there are several strategies that will affect the use of solvents, particularly in the aerospace industry. One control measure will seek to improve what is known as "transfer efficiency"—essentially the rate at which coating materi-

als are applied to the substrate that will eliminate or reduce the wastage that ends up in the atmosphere.

As you heard earlier in today's testimony, it was presumed by your two first witnesses that paint over-spray may have been the cause of some of their exposures. Improving transfer efficiency would tend to limit the amount of over-spray that would occur and would tend to reduce the exposures outside of the immediate coating area.

In the area of clean-up of metals and other substrates, a great many solvents are used in the South Coast Air Basin. We have been looking at lowering the vapor pressure of these solvents so they are less emissive. Unfortunately, many of these lower volatility solvents also are some of these compounds which have been identified as carcinogen.

Also, in the area of degreasing we have been looking at substituting solvents and improving the efficiency of the degreasing operations so that fewer amounts of solvent material remain on the substrate when it is removed from the greasing operation.

Finally, the area of disposal of solvent-laden waste is one that we are concerned with because these wastes, in some instances, may illegally end up in so-called "sanitary land fills." But, more likely, as you heard in your testimony earlier, these end up in sewage streams that go to the publicly-owned treatment works.

Unfortunately, these publicly-owned treatment works are charged with the responsibility of improving the discharges from these plants to water quality levels and the process typically strip out these volatile materials in air strippers and essentially transfer these solvent materials from the water medium into the air medium, and now we end up with environmental exposures near and adjacent to the facility.

In fact, this has become an area of such great concern by the operators of these publicly-owned treatment works that they are very concerned that if they were put in a position of having to manage public exposure risks to carcinogens that they would clearly, in many cases, already exceed the one in a million risk level from the air strip emissions from these facilities.

This is a brief overview of the district's responsibilities and some of the actions that we will be taking in the air quality management plan over the next 20-year span.

Senator REID. Mr. Moyer, I met with the director of the South Coast Air Quality Management District in my Washington office and spent some time with him. Certainly, to say the least, you have an aggressive plan. I hope you can meet those goals.

Mr. MOYER. I, personally, have a three-year contract. This is a 20-year program. I think it will keep a lot of us busy for quite some time.

Senator REID. Do you think that you can meet the goals?

Mr. MOYER. We're very hopeful in that what we expect to see is changes over this time period in the way we conduct business. We're not just looking for putting emission controls on existing industry; we are looking for business and commerce to look at their long-term plans and long-term corporate planning and decide how to do business differently so there are less air effluent involved.

Senator REID. For example, you have mentioned what most people don't realize is that these solvents create a real air quality problem; is that right?

Mr. MOYER. Yes, indeed.

Senator REID. When I met with your director, he indicated that one of the goals that was already established in your plan has been accepted, isn't that right?

Mr. MOYER. It has been adopted by our governing board. It is still pending acceptance by the State Air Resources Board. It has not yet been forwarded to the EPA.

Senator REID. I see. But part of that plan calls for changes in the way cars are painted, as an example, because the paints emit on a continual basis?

Mr. MOYER. That's correct, although it is sort of a dilemma because we have seen improvements made in auto coating in this area in the last 10 years. For instance, we have gone from largely solvent based coating systems to, in many cases, what are known as water-borne systems or high-solid systems—systems that have low solvent content. I should note, though, that that does not necessarily improve the risk situation with regard to exposure to toxics because some of these new coatings which substitute—

Senator REID. They're just as bad?

Mr. MOYER. Contain components that are just as troublesome with regard to toxic effect.

Senator REID. We have had some testimony here today that some of these toxic substances may be shipped to Mexico, as an example. Do you know where these toxins are taken?

Mr. MOYER. From my experience with the San Diego Air Pollution Control District and contacts with them, there are operations south of the border which, in some sense, try to recover or reclaim solvents so that they can be brought back into the cleaning streams.

Senator REID. So it is possible that some of these are shipped to Mexico?

Mr. MOYER. Yes. There has been evidence of that.

Senator REID. If these rules that have been adopted by the district but not the State are implemented, would it mean major changes for facilities like Lockheed and Northrop if it changes the manufacturing process but would require no equipment?

Mr. MOYER. In the area of solvent use, I believe that is likely to be the case, though this will be over a phased period of time. With regard to manufacturing process using advanced materials like the composites you have heard, I think that rather than affecting those processes it means those processes will have to be conducted in, for want of a better term, environmental chambers that will manage the release of those materials and also, through protection of workers, manage worker exposures and then process the vapors or fumes from them into control equipment.

We have seen this in a very limited number of military recoat facilities where the entire hangar has, in fact, been turned into a large spray booth and all the air in the hangar has been processed through emission control equipment.

Senator REID. Mr. Moyer, one of the things we have danced around a little bit here today is top security contract work for the

government. Does this automatically exempt these facilities from inspection?

Mr. MOYER. No, it doesn't exempt them from inspection, but it does pose some fairly unique problems for an agency like ours.

Senator REID. And we don't have those problems worked out yet, do we?

Mr. MOYER. Well, I'll tell you the fashion in which we have worked it out, and I'm not sure that it is wholly satisfactory. In order for us to conduct what we would consider a routine inspection, one of our inspectors had to get a secret clearance from the Department of Defense, and his supervisor had to similarly get a secret clearance in order that he could debrief that individual, but no other individuals in the district have access to the information that may be collected during those inspections, and it does limit our ability to understand what the emissions are from these facilities because of those restrictions.

Senator REID. Doctor Papanek, you have indicated that in California the CAL OSHA is funded by 50 cents per worker per year. That sounds like a small amount to anyone involved but, in fact, isn't that more than a lot of States?

Dr. PAPANEK. Yes, sir, it is. I agree with that. It is more than many States, and it is more than the Federal program was spending per worker when it was in existence in California for about two years.

Senator REID. But there is a lot more going on in California than other States also; isn't that right, a lot of industry?

Dr. PAPANEK. I think that is true, although I think if you normalize it on a per worker basis it still comes out to be an amount which is relatively low.

Senator REID. The term you used I believe is an "illness cluster." Is that the term you used?

Dr. PAPANEK. Yes, sir.

Senator REID. And that's a defined area where there are problems relating to people's health that are unique; is that right?

Dr. PAPANEK. Or out of the ordinary. A surprise.

Senator REID. I was struck by the observation in your statement that surveillance for occupational health problems is lagging well behind attention to other public health problems. Is that a fair summarization of what you have said?

Dr. PAPANEK. Yes, sir.

Senator REID. That seems to indicate that all of the industry reporting and record-keeping rules either aren't being enforced or the information isn't being appropriately used; what is your assessment?

Dr. PAPANEK. I think those are both accurate. I think it is also true that until recent legislation—and I think that Superfund Amendments Reauthorization Act, SARA Title III, which requires, for the first time, reporting of an inventory of hazardous materials on site, before that kind of legislation came on board it was very difficult for an enforcement agency to know where to begin. Not only did we not have a uniform way of reporting illnesses—although physicians are required to report illnesses, it is well known that reporting among physicians is well below what is actually occurring.

If you approach it from the risk side, there really was no way for an agency to begin to get a handle on where the majority of a particular kind of solvent is. Where are the carcinogens? Where are the heavy metals? So I think that as some of these community right-to-know laws begin to come into effect, we are going to have a better surveillance tool, and it is an opportunity for those of us who are in epidemiology to use the tool and to break new ground.

Senator REID. The first toxic release inventory was just published under the Superfund community right-to-know program. Information is now available down to a facility-specific level on the releases of toxic pollutants into the air, water, and land. It would seem to me that this body of information would help you in your task of identifying both worker exposure problems and those of people who live in the surrounding air facilities; is that true?

Dr. PAPANEK. Yes, sir. I think that is absolutely true.

Senator REID. And that's brand new, so we really don't know the impact of that; is that right?

Dr. PAPANEK. Yes. And how will we use it? And how will we begin to assess how accurate that inventory information is? What is the best way to move from simple information on either storage or release to what really is the kernel, which is the exposure? Of course, its storage and release are not synonymous with exposure, and that's really what we need to know about. How we will do that is an evolving question.

Senator REID. Doctor Papanek, we have established—at least in my own mind I have established—that there aren't medical doctors who are interested in, have the time to, or are trained to look into the effects of chemicals on people—neurotoxins. They have a lot of strange symptoms that aren't normal and ordinary. Have you found this is the case, that there aren't really people in the medical community to look into the problems of these workers who have been exposed?

Dr. PAPANEK. Yes, sir, I have. And, as an example, to again move back to lead poisoning, one of the oldest diseases that we do understand, when we recently tried to put together a panel of physicians in my county that we could refer industries to—industries who might want to begin to come into compliance with requirements and standards—that list wound up being very short.

Senator REID. The reason I mention that to you, as I have mentioned a couple of other times today, is that I would think that probably we have some of the same problems trying to find an industrial hygienist. First of all, what is one?

Dr. PAPANEK. An industrial hygienist is a person who is trained in some environmental toxicology, and also trained to do environmental measurements and has training in industrial processes to really carry out the measurements of air or other kinds of exposure or risks in a work place.

Senator REID. Are there schools that train such people?

Dr. PAPANEK. Yes, sir, there are. Many university programs have—UCLA right up the block here.

Senator REID. You have said that there is a shortage of those.

Dr. PAPANEK. Of those training programs.

Senator REID. And when you said that you could use 50 or 100, did you mean nationwide or in California?

Dr. PAPANEK. In my county we could probably swallow up 50 to 100 additional industrial hygienists per year.

Senator REID. In your county being which county?

Dr. PAPANEK. This county of Los Angeles.

Senator REID. And the State of California then could use more than 50 to 100?

Dr. PAPANEK. Probably three times that many.

Senator REID. And nationwide you'd multiply that in the larger States—Illinois, New York, Texas?

Dr. PAPANEK. Yes.

Senator REID. That might be something that we need to look at in Washington to try to develop some specific incentives for people to go into those programs because, as you have outlined the qualifications, it is something that we are lacking in various areas of this country, and that is people interested in going into the sciences in the first place, and an industrial hygienist would have to have a basic background in science; is that right?

Dr. PAPANEK. In chemistry.

Senator REID. So that's something that we'll look into.

Has your office undertaken any efforts to address the widespread worker health problems that we have heard described here at Lockheed and have been described in numerous newspaper articles and other places?

Dr. PAPANEK. We haven't been involved specifically in Lockheed. No, sir.

Senator REID. And why haven't you been?

Dr. PAPANEK. Partly because it did fall under the jurisdiction of OSHA. And, although the county health officer has the broad responsibility for looking at the public health, first of all we're not staffed to do it in my department, which is a sad state of affairs, I think; and, secondly, we were hopeful that other agencies would move in and plug that gap.

Senator REID. One of the things this subcommittee has jurisdiction over is asbestos. Do you feel it is a danger in the work place today?

Dr. PAPANEK. Well, it still is a danger in the work place. I think that we're a far cry from where we were two decades ago. If I were to say where we should go next with asbestos, I think that there is an awful lot of awareness about asbestos already out there. Employers are beginning to know about it. Where we have a problem is when an employer says, "I wonder if I've got a problem. Can I hire somebody to come and help me?" That is somewhat of a bottleneck.

Senator REID. In addition to having people not trained to identify problems with asbestos, we have a double problem in not having people trained to clean it up once the problem is identified, right?

Dr. PAPANEK. Right.

Senator REID. I have a serious question in my mind and I'd like your thoughts on this. I'm not too sure that we don't do as much harm as good when we go in and expose this asbestos which has been all tied up for decades.

Dr. PAPANEK. You have to also ask the question—again, dose is everything in toxicology. So with regard to environmental asbestos exposures or the occasional exposure to asbestos in a work place

where the asbestos is structural, if you carry out a risk assessment you'll wind up finding out, which we've done on a number of occasions when we have gone into buildings, that a worker exposed for one working week to a situation where asbestos is present and is friable and crumbling in visible form, the maximum cancer risk to an individual is on the order of 10⁻⁴ to 10⁻⁵, a risk which, frankly, is comparable to side-stream cigarette smoke for the same period of time. It doesn't mean we ought not to be focusing attention on it; it just means that it would move further down my list of priorities for things to attack first.

Senator REID. Tell me a little bit about this lead poisoning. I thought that it was basically a thing of the past. What got your office interested in this?

Dr. PAPANEK. Well, I got interested in lead poisoning just because from about 12 or 15 years ago I had a number of patients that I happen to have seen that were lead poisoned, so I have done some research in the area. When the State of California made lead poisoning reportable and gave the county health department a role to play, those reports began to come to my office. And part of our interest in lead poisoning is not that we have lead poisoning to the extent that we had it three or four decades ago, but because our understanding of the toxicology of lead has moved on to levels that we previously thought were perfectly safe we now know are not safe, and we also know that the OSHA standard for lead, although it is a reasonably good standard compared to others, is woefully inadequate to protect workers. It needs to be strengthened in important ways.

It is also an area that is easy to diagnose. There aren't so many toxins like lead where you can just do a blood test and have your answer by the day after tomorrow and where exposure is so clear cut. So, with all of those facts, it seemed a good candidate for a hazard to go after to try to prevent using these kinds of public health approaches that I outlined.

Senator REID. Where does lead exposure come from now? It is not in gasoline, is it?

Dr. PAPANEK. No. It is not so much from gasoline any more—there is still some exposure. It still occurs in many industrial processes. We see it in battery manufacturing plants, secondary lead smelters—

Senator REID. But it is mostly work place—

Dr. PAPANEK. Yes, sir. These exposures in adult are 99 percent work place. We do not have adult non-occupational lead poisoning in my county which is anything but work place. We still have some pediatric lead poisoning, however, which is lead paint.

Mr. MOYER. I'd like to add to that lead air quality on a public exposure basis has been one of the few unambiguous air pollution successes that we have had. Prior to the gasoline lead phase-down program in the L.A. County area and other metropolitan areas of California, we had routine violations of the Federal and State lead standards. Since the lead phase-down, that has been eliminated throughout California. As Doctor Papanek indicated, probably the only adult exposures are occurring from the work site, though pediatric exposures may have other aspects.

Senator REID. Which, Mr. Moyer, this confirms what Doctor Papanek said earlier; namely, that we need to do a lot more work in worker exposure to all kinds of chemicals. We are way behind times on that.

Dr. PAPANEK. And lead is an important one, also, because we have now found many cases of pediatric exposure from take-home lead. The worker has the grungy, grimy baseball cap, dungarees, and the child is exposed at home because of that.

Senator REID. Doctor Papanek, what about using NIOSH along the lines that you suggest to help with the epidemiology that you have talked about?

Dr. PAPANEK. I think NIOSH is an agency that could do this job. It could step in and begin to do the surveillance both on a proactive basis and in response to illness clusters. I think that as NIOSH is now constituted with offices spread fairly sparsely throughout the Nation, that job won't happen. You have to do surveillance on site. We need to have regional or even local NIOSH offices. The Southern California Office—you just can't use the databases that we have here from thousands of miles away.

Senator REID. What could a Federal effort do best to help local jurisdictions or counties such as L.A. to do this job?

Dr. PAPANEK. There certainly could be a direct infusion of funds for a specific programmatic purpose such as this kind of surveillance. We have, in the documents that I have given you, made a rough calculation that even a ten professional staff program in my county could do a tremendous amount to understand the distribution of illnesses and risk and to begin to do a basic outreach kind of a program. So the direct infusion of funds or a comparable effort by an agency such as NIOSH based locally. A fairly modest effort could really pay big dividends.

Senator REID. I appreciate very much your patience in waiting and your testimony here today.

Is Mr. Gary Price here?

[No response.]

Senator REID. Doctor Robert Harrison.

[No response.]

Senator REID. Doctor Albert Meyerhoff.

[No response.]

Senator REID. We now have the opportunity—and we do this at all of our hearings—any one wishing to testify who is not on the list of witnesses now can come forward. We have had a request from Laurie Liberty. If there is anyone else wishing to come forward, please come forward.

Will you both raise your right hands please?

[Witnesses sworn.]

Senator REID. Please state your name.

Ms. GAUSMAN. Beth Gausman. I'm the president of the Chemically Injured United Coalition. I testified previously at the Washington, D.C. hearing.

Senator REID. What do you wish to tell today?

STATEMENT OF BETH GAUSMAN, PRESIDENT, CHEMICALLY
INJURED UNITED COALITION

Ms. GAUSMAN. I'd like to speak about this problem. This is a problem. We have heard a lot of testimony about toxic exposure in the work place. It is a terrible problem. We started a coalition. I have people that call me almost daily with their exposures, their symptoms. There is almost, as was testified today, no public entity that is set in place to take care of these people.

Some of these people are very, very ill. Some of them are disabled. They all seem to be having hypersensitivities to other chemicals.

It is just a horrible problem, and we're trying to get people to become united to try to get them to have their rights. Clearly, they don't have adequate rights in the work place.

I have people even now from Lockheed calling me and telling me that they have not even seen an MSDS sheet and they have worked for Lockheed for ten years. Somehow they have gotten the number of our group or whatever, and people—I wish I could do something immediately for all these people.

Senator REID. Is this a California-based organization?

Ms. GAUSMAN. No. It is a national coalition.

Senator REID. Have you been in contact with any of the people in the State of Washington?

Ms. GAUSMAN. Yes.

Senator REID. The Boeing facility?

Ms. GAUSMAN. Yes. Faye Schraum and their group. They have about 40 people in their group who are our members, also. They have tried to band together. They are just poisoned people across the country that their work or their environment has poisoned them. I founded it because I, myself, was poisoned when I was just, as a pedestrian, standing by a United Parcel Service van carrying the same toxics these people work with. It was fuming, and I got exposed. I haven't been able to work. I'm disabled. I have the neurotoxicities that everyone else has. The medical profession victimizes the victim, also. The legal profession many times, as we have heard—Randy Fullerton spoke of this—it is very difficult to get an attorney. It is very complicated. The public agencies don't have the material safety data sheets available initially.

I feel that it is crucial that the people know immediately what they are exposed to. They should have immediate training on everything that they are using. They should have the equipment. Most of these things, as Senator Reid pointed out, could be totally avoided.

We have people in our 30s that are hurt for the rest of our lives. It is a horror story.

Senator REID. How old were you when you were walking down the sidewalk and this substance spilled?

Ms. GAUSMAN. I was 36.

Senator REID. Laurie Liberty, would you state your name and what you want to say before the committee today?

STATEMENT OF LAURIE LIBERTY

Ms. LIBERTY. My name is Laurie Liberty. I have been a Lockheed employee and was a Lockheed employee for nine and a half years.

Senator REID. How old are you now, Laurie?

Ms. LIBERTY. I'm still 33, same as I was. I wanted to speak about—since I was in the hearing in Washington, Lockheed has cut off all my medical benefits. I have nothing.

Senator REID. Did you have benefits when you were back there?

Ms. LIBERTY. Yes. I have had benefits this whole time. So I went to the dentist and everything has been cut off. I have been calling around, and they said "You were going to be notified." I never got notification about my medical being cut off.

Senator REID. Laurie, would you state for the record what your physical complaints are since this is a new record?

Ms. LIBERTY. Okay. I have had a severe grand mall seizure.

Senator REID. When?

Ms. LIBERTY. That occurred approximately one year ago.

Senator REID. Had you ever had one prior to that?

Ms. LIBERTY. No, I have never had one or anything like that. I don't remember what happened. It has caused—I have got terrible brain damage. I am 40 percent brain damaged now. My eyes have been impaired.

Senator REID. Why do you wear the dark glasses?

Ms. LIBERTY. Because I can't stand any light. In fact now they just recently found something else wrong with my eyes. They are not toxicologists, so they surely can't say that the chemicals had caused the eyesight problem.

My skin was totally spotted from all the chemicals.

Senator REID. Why do you wear gloves?

Ms. LIBERTY. My hands are totally—from using the solvents on the parts of the airplane, itself, had damaged my fingertips, my nails, my thumbnails are coming off. As of two weeks ago I started losing all my feeling now in my fingers. And I can't go without the gloves. I try once in a while to let my hands free, but I'm not supposed to be out without the gloves on.

My resistance is lowered. Since I was in Washington, I have been sick approximately three months out of that whole time, and I have now lowered my tolerance and I now unfortunately have picked up herpes—not sexual herpes. Sitting on a bus bench to go to the doctor, or it could have been off the bus. But over and over and over.

Now I'm contracting any type of infectious disease. Anything that is in my way, I'm getting it.

This has been terribly hard.

Senator REID. Are you able to work?

Ms. LIBERTY. No. They took me permanently out of work for life.

Senator REID. Do you have any disability insurance coming in?

Ms. LIBERTY. Disability runs out July 26.

Senator REID. And then what do you do?

Ms. LIBERTY. I'm hoping Social Security will do something because nothing is going on. They just now finally at Lockheed asked for my medical.

Senator REID. Has your claim against Lockheed yet been settled?

Ms. LIBERTY. No.

Senator REID. When do you expect it to be?

Ms. LIBERTY. That's a good question. I don't know. The lawyer is still—we're still trying to get things together, and Lockheed is not doing anything. Now that they finally have had me sign releases for my medical charts, hopefully this will move it up. I'm hoping through all this.

Senator REID. When did you quit Lockheed?

Ms. LIBERTY. I didn't quit.

Senator REID. When did you stop working?

Ms. LIBERTY. My psychiatrist and my medical doctor took me fully out of work for life.

Senator REID. When?

Ms. LIBERTY. That was approximately five months ago.

Senator REID. How many different types of medicine do you take a day?

Ms. LIBERTY. I'm taking approximately eight, but now I am increased on all my doses. I'm taking anywhere between 20 and 32 medications a day.

Senator REID. Is this in pill form?

Ms. LIBERTY. Yes, it is.

And I did want to say something about Lockheed, if I may. With the payoff from the Air Force, the Air Force is the one that gave Lockheed the \$6 million in order to take care of their cites that they received from OSHA. Now, surely this finally agreed to pay it. But where is the \$4.5 million? Why isn't it going to the people that are sick or for them to do something about their doggone damn problems in their company? It is ridiculous. They don't give a darn about anybody. All they're doing is moving out of State, getting rid of all their employees that are here, and hiring a new crew. But it is going to be somewhere else, and they'll start doing this toxin thing all over again through the plant and they'll go through this employee problem.

Senator REID. Thank you both very much.

Ms. GAUSMAN. Thank you, Senator Reid.

Ms. LIBERTY. Thank you.

Senator REID. There being nothing more to come before this subcommittee, I want to make a couple of statements.

This is the second hearing that we have held. We will hold others. It would appear that this issue simply isn't going to go away.

I think the fact that we have held these hearings has been important. I note that Lockheed, on July 1st, agreed to pay the OSHA fine. This is a major concern.

We have been able to identify some problems in the aerospace industry. Doctor Papanek did as good a job as anyone that I have heard indicating that we have problems all through the work place and we simply aren't doing anything to get to the bottom of it.

The issue of composites is something that will also not go away. This is a major concern of this committee, and there is going to be more heard from this committee. There is no question that we need to do more research. There isn't any being done. I think the Federal Government has an obligation to set a standard for making the work place safe.

This is a new world in which we are dealing with all these products. This isn't like it was when we had the people working on airplanes during the second world war driving rivets. We are now working with very sensitive, supertechnical products. Mixtures have to be very definite. The way that these products are made is not known to most people. So it is clear we need to do a lot more work on this.

This committee will continue its investigation in the coming months.

I want to thank everyone for being here. I am disappointed that a number of witnesses were absent. I assume the 4th of July holiday had something to do with that. However, what concerns to me is that we didn't have someone from the State of California Department of Health Services appear. I'm disappointed that Doctor Harrison, for whatever reason, isn't here. I'm certainly concerned that Mr. Meyerhoff of the Natural Resources Defense Council wasn't here. But we will accept written testimony from these individuals, and this record will be kept open for a period of two weeks so that anyone else wishing to submit testimony can do so.

This subcommittee stands in adjournment.

[Whereupon, at 12:08 p.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

[Statements submitted for the record follow:]



PREPARED BY	R.J.F.
DATE	7-5-89

TESTIMONY OF:
RANDALL J. FULLERTON
TO
THE UNITED STATES SENATE
COMMITTEE ON ENVIRONMENT
AND PUBLIC WORKS -
SUBCOMMITTEE ON TOXIC
SUBSTANCES (AEROSPACE)
ENVIRONMENTAL OVERSIGHT,
RESEARCH AND DEVELOPMENT
JULY 5, 1989

A-1

OPENING TO COMMITTEE:

PREPARED BY	RJF.
DATE	7-5-89

Good morning (afternoon) Ladies (?)
and Gentlemen.

I would like to take this time
to thank you from the bottom of
my heart for the opportunity to
speak with you today.

It has been a long and painful
five years in getting here!

I would like to extend special
thanks to the honorable Senator from
Nevada Mr. Harry Reid, and to
Ms Sheila Humpke.

Her compassion and understanding
of the situation has been greatly
appreciated!

Again my heart felt thanks
to you all!

A-2

Lockheed: MY WORK EXPERIENCE
1984 - RANDALL J. FULLERTON

RTF
7-5-89

from July of 1984 thru June of 1987. I complained vehemently about the use of toxic chemicals at Lockheed, without protective gear being supplied! And just as vehemently about the fact that the labels had been deliberately removed (kept off to begin with?) from the cans of "solvent" we used, preventing us from knowing what we were using! I still do not know what I used five years later. No M.S.D.s were ever given out.

I complained loud and clear but no one listened!

- Not my employers, New West.
- Not Lockheed, who ignored the problems for years.
- Not OSHA, who refused my pleas for help during numerous calls I placed to them in 1984 & 1985.
- Not my own lawyers who refused to investigate my repeated allegations that others were getting sick at Lockheed, because it cut into the profit margin, the same reason I never received one copy of my own medical reports!

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LOCKHEED: MY WORK EXPERIENCE - 1984
RANDALL J. FULLERTONRTJ.
7-5-89

No one listened, no one cared!

I can't help but wonder how many workers suffered needlessly over the last five years, simply because CAL OSHA. Not only did NOT take me seriously, they lied when they said everything I was OK at Lockheed, that they were out there all the time, and Lockheed doesn't use any toxic chemicals that would hurt anyone!

In the early spring of 1984 I went to work for a company by the name of Western Pacific Crating Co. This company had a contract with Lockheed to specially seal individual aircraft wing planks, and also to build the crates in which they would be shipped.

We would then pack these wrapped wing planks in the crates, and seal the crates with

A-4

water proofing chemicals for shipment.

We worked exclusively on Lockheed property in building A-1 Burbank, Ca.

After only a month or two Western Pacific "lost" its contract with Lockheed. I found out the new company coming in to take over, was called New West Export Packing Co. I applied for a job with them, and was hired sometime in June 1984.

I would like to take a moment here to describe the working conditions if I may.

A-1, the building in which we worked is a converted aircraft hanger, where the temperature inside was, more often than not, hotter than outside. It was routinely well over 110° degrees inside the building!

The building itself is situated on a corner of the most heavily traveled street in Burbank, and the entrance to the Burbank (Lockheed)

A-6

Became our new priority, to remove the paint "overspray," from the hundreds and hundreds of wing planks that had been damaged.

This new duty had been assigned by Lockheed.

The first few products we tried were an exercise in futility.

We were then given cans of a "solvent" or "acid" of some kind that removed the paint with very little effort at all.

The labels from these cans had either been deliberately removed, or had never been put on in the first place!

I cannot stress this point enough, not one of the 20-25 cans of this product we used over the next couple of weeks, had labels of any kind on them.

This product was stored in a refrigerated metal box that was also unmarked, upstairs in building A-1.

This product was extremely hard to use, as soon as you opened a can you would all but be knocked over by the fumes, they were the strongest

A-8

dust masks for our nose and mouth, that did absolutely nothing to prevent the fumes from getting through, and some big thick black industrial type gloves that I thought would help, until we tried them.

The "solvent" ate right through the gloves in a matter of 2 or 3 minutes. The parts of the gloves that came in contact with the "solvent" would just disintegrate!

That night after work I could literally taste this product in my mouth (very strongly) as if I had taken a drink of it straight from the can!

My girlfriend at the time even noticed it, pushing me away and asking in no uncertain terms what the ... I had in my mouth, when I kissed her goodnight!

The symptoms had increased in severity each day during the last three weeks, and had stayed with me longer and longer each day after work as well! The symptoms would subside (after work) less & less, as each day passed!

A9

The next day at work we decided to try the gloves again, but it was obvious to us they were completely worthless, we must have gone through some 30-40 pairs in about an hour and a half of use.

About an hour later I started to pass out from the fumes and was grabbed by my co-workers, who took me to the Lachreed nurses station, where I was given oxygen for about 20 minutes.

Not feeling any better, I was then taken to a medical clinic used by New West Export Packing Co.

The doctor told me to take a couple of days off, and to stay away from the fumes when I returned to work.

I attempted this, but it was impossible! Over the next week the insurance co. sent me to a couple of their doctors, and my roommate suggested I call an attorney she had used once before! I did, and then the fun began. He sent me to a doctor, and I didn't hear from him again, for

A-10

seven months.

Thus began what will soon be five years of pure... in dealing with inept lawyers, an unjust worker compensation, and Lockheed denials!

And now to see, not only, did OSHA find Lockheed guilty of EVERYTHING I have been saying for almost five years, but it goes far beyond that, to contamination of the ground water, so bad that the city of Burbank had to shut its wells down (as did neighboring cities) and purchase its water elsewhere!

It has also been recently reported that Lockheed is also the second leading air polluter in the Valley, releasing some 303,000 pounds of cancer causing PCE into the air!

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No compensation for Many Workers!

The term "Worker Compensation"
is itself a fallacy!

The insurance company can cut off
your "benefits" by any number of
ways, one is to send you to "their"
doctor, who will say there is nothing
wrong. The insurance company is
then justified by law in cutting off
benefits until an A.M.E. is seen,
in some cases, two years after the
original injury!

This while the insurance company
pockets billions in profit (confirmed
by independent audit) at the
expense of the employer and
the victim, who more than likely
will lose his or her job, should
their injury be serious enough
to keep them from work for
any length of time, issuing a check
of money at most!

The victim may not only lose
their job, but also may lose their

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care, their home and their dignity!

Not to mention creating terrible financial hardship on the rest of their family, providing of course they have a family that is in a position to help. Thank God I did!

The California Worker Compensation System is not only unfair & unjust in many ways, I believe the system itself violates certain rights as guaranteed under the United States Constitution, namely Amendment VII which deals with civil suits, Article I section 10; Criminal, and Amendment II which makes the United States Constitution, the "Supreme Law of the Land".

The Worker Compensation System, in the name of greed, cause the victim much more additional, and needless, pain and suffering, long past the initial injury, than should ever be allowed by this society. * Please see articles & editorials in section "L" particularly L-4, L-5, and L-6 thru L-12

NAME
A13

LOCKHEED: COLOR CHART FOR
SECTIONS OF REPORT - IN ORDER -

TYPE - REC'D
DATE
RJT
7-5-89

A - RED - OPENING STATEMENT - MY EXPERIENCE
AT LOCKHEED - 1984

B - PURPLE - 3 1/2 yrs. AFTER MY EXPOSURE
FIRST PRINT NOTICE OF CANCEROUS
CHEMICALS AT LOCKHEED - 2-29-88

C - BROWN - FIRST REPORTS OF ILLNESS AT LOCK-
HEED & OTHER AEROSPACE - 8-6-88

D - GREY - OSHA - VIOLATIONS, FINES 3-89 thru 5-89

E - YELLOW - LOCKHEED & WRIGHT-PATTERSON AF. BASE

F - ORANGE - MAY & JUNE 89 - TOXIC PROBLEMS CONT.

G - GREEN - OSHA - WHAT CAN THEY DO?

H - DARK BLUE - LOCKHEED - GROUNDWATER

CONTAMINATION - 4-89 thru 6-89

I - LIGHT BLUE - EPA, TOXINS & "POLICY"?

J - BLACK - LOCKHEED - MAJOR POLLUTER IN
THE AREA, 4-89 thru 6-89

K - PINK - LOCKHEED - CUTS JOBS - 6-89

L - BROWN-2 - AFTER LOCKHEED - "WORKER -
COMPENSATION" A MYTH!

M - BLACK-2 - LOCKHEED "BUSINESS"

Living & Gentlemen

My name is Mark Gillaspie and I was an aerospace worker for nine years from 1979-1988. ~~At~~ Unfortunately, I will probably be an injured and unemployed aerospace worker for the rest of my life.

This due to my overexposure to toxic chemicals in my workplace. Some of these chemicals are new developments in this industry and just as many are old ones that are quite common. What is even more disturbing to me is that some of older more common ones in use are ones that you ~~are~~ our Government have banned such as MEK & some types of asbestos. Of these chemicals and substances some are only legal for use on Government projects ~~or~~ by the Government. I would like to know Why!! How can you say this is banned or illegal but we can use it! Of the new ones such as phenol epoxy & graphite Composite

that manufacture and use them are not quite sure how they will react in an aircraft let alone how they will react on the human body. Because these substances are new and unknown they are often treated as harmless materials until someone like myself and coworkers get sick and prove otherwise. It would seem that in the infinite wisdom of these multibillion dollar corporations and in you our government, that these new and untested materials and components would and should be treated as extremely hazardous & toxic until proven harmless.

One of the biggest problems as I see it is secrecy. Understandably there is ~~not~~ need for secrecy from other governments, from the general public and between ~~company~~ corporations.

But somewhere, at some point, it becomes ridiculous and secrets are kept from the workers, the government and regulatory organizations such as OSHA. Need to protect workers and the public.

— know there are people here today from companies that make use and or distribute composite materials, and they are undoubtedly going to hand out miles and miles of paperwork and statistics that will try to explain how safe and unthreatening these materials are. But, these people are not working or ~~living~~ living in the real world. As you well know, being in the government, paperwork and statistics can be made to say anything you want them to. But I as many other people in this audience today know what the real world of these chemicals and materials is. It's a world of severe headaches, rashes, nerve damage, liver disease, lung damage, cancers of every kind, depression, and constant worry of what will this do to me or my family next. Until workers are properly trained and protected, and companies are forced to strictly

governing the use and disposal of
 of new and old chemicals and toxic
 substances the defence workers
 that have built this ~~the~~ Nation into
 the most powerful nation on earth
 are left with no defence at all
 to protect themselves. Large fines
 are not the answer because unfortunately
 you senators do not live in the real
 world either. You find these companies
 guilty of willful neglect of Federal law
 and fine them millions of dollars. Then
 you let them pay the fine and
 drop the willful charges off the record.
 In the real world this is selling
 the worker and the public down the
 river. If ~~there~~ any company is found
 in violation of Federal worker safety
 or environmental safety laws, they should
 be shut down until which time it is
 determined they are in compliance
 with such laws and no plea bargain or
 charges.

I find it utterly ridiculous that
 I and other average Joe Blow
 citizens off the street can gain a
 SECRET security clearance ~~on~~ SECRET
 AND TOP SECRET GOVERNMENT PROJECTS
 but company Doctors, OSHA officials
 Congressman, Senators, and Union Reps
 ARE constantly, and will probably continue
 TO BE DENIED ACCESS to WORK AREAS,
 HEALTH RECORDS, MSDS, and work process
 RECORDS UNDER THE guise of security
 clearance and need to know practices
 and procedures. Also because of these
 conditions and circumstances I myself
 have witnessed extensive cleanups, ~~and~~
 sterilizations, and coverups before onsite
 inspections. I would also like to know
 why ~~the~~ the waste from these SECRET
 materials that nobody can get clearance
 to see, are packed in small barrels
 labeled in Spanish and sent to Mexico for
 disposal!

In closing I would like to
 Thank you for allowing me to speak
 my mind here today and I would
 like to ask for your help to
 make the Aerospace Industry
 safe from misinformation on safety
 and safe from people and companies
 that are only interested in profit
 not worker safety. I would also
 like your help in keeping this
 nation from becoming a ~~country~~
~~country~~ of the corporation, by
 the corporation, for the corporation

Thank You
 Mark R. Gillopin

TESTIMONY TO THE U.S. SENATE SUBCOMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT AND RESEARCH AND DEVELOPMENT ON
THE USE OF ADVANCED COMPOSITES IN THE AEROSPACE INDUSTRY

Los Angeles, California

5 July 1989

By: David Forest

Past Chairman of SACMA, Current SACMA Director, and
President, BASF Structural Materials, Inc.

Thank you, Senator Reid, for the opportunity to testify to the sub-committee on the use of advanced composite materials in the aerospace industry. My remarks today are on behalf of the Suppliers of Advanced Composite Materials Association (SACMA), the industry trade association.

SACMA has about two-dozen member companies who are engaged in making the fibers, the matrix polymers, and the prepregs that collectively are called advanced composite materials. Our customers include the companies who fabricate components for aircraft and aerospace systems and who are represented by the AIA trade association. The companies represented in SACMA are predominantly chemical and petro-chemical companies including, besides BASF, the DuPont Company, Shell Chemical, Amoco, Hercules, Ciba-Geigy, ICI, Hexcel, and a number of others.

The Term "composite materials" is used to describe a number of different kinds of products whose single similarity is that at least two different materials are combined to make a new material which has different properties than the constituents. Concrete is a composite material, for example, since it combines cement and gravel. Most often, however, the general term refers to some kind of plastic reinforced with glass fibers. The term "advanced composite materials" is loosely used to denote a group of materials which have higher performance than reinforced plastics in general. This higher performance can come from the use of newer fibers, such as carbon fibers, or newer plastics, such as polyimides, or simply by careful processing of conventional glass fiber reinforced polyester, phenolic, or epoxy resins. If I leave you thinking the boundaries between reinforced plastics, composite materials, and advanced composite materials are fuzzy, you have grasped the situation correctly.

Advanced composite materials usually combine the properties of high strength and high stiffness, low weight, corrosion-resistance, and in some cases, special electrical properties. This combination of properties make advanced composites very attractive for aircraft and aerospace structural parts. The materials are used in considerable quantities as well for golf shafts, fishing rods, tennis racquets, racing car bodies, bicycles, medical X-ray tables, robot arms, and racing yachts. The latest winner of the America's Cup yacht race was the "Stars and Stripes" catamaran which was largely constructed of carbon fiber reinforced epoxy composite material. The losing New Zealand boat also used carbon/epoxy material - but that's a different story. As you may know, the American boat scored a resounding victory on the water, but the cup was lost to New Zealand later on in a court of law. We trust America will recover the cup, using advanced boats and advanced composites in 1991.

The use of the term advanced composite materials really began in the mid-1960's with the development of boron and carbon fibers. In the past 20-years, these new materials have come from the laboratory stage to a rapidly growing new industry, employing some 20,000 people making the materials and the parts and generating sales of well over \$1-billion dollars in 1988. My prediction is that the use of these materials will continue rapid growth well-past the year 2000, at which time some 750,000 people will be involved in a \$30-billion dollar per year industry. Along this future path lie new applications in commercial and military aircraft, ground and marine defense systems, rapid transit vehicles, industrial machinery, and eventually civil structures such as long-span bridges. One study, for example, suggests that advanced carbon fiber composites are the only feasible materials, from a technical standpoint, which could be used to construct a bridge connecting the mainland of Spain to the island of Gibraltar. The study also points out that such a bridge would require all of the world's carbon fiber production for 5 consecutive years to build. So don't look for this to happen right away.

North America is the center of production and consumption of advanced composites in the "free-world", with about 60% of the demand. The balance of demand is roughly an equal split between Western Europe and Asia, primarily Japan. In North America, about 80% of advanced composite usage is in aircraft and aerospace applications. The same is true in Western Europe. In Asia, the major use is recreational and industrial items, since the aerospace industry is still small there.

Advanced composite materials cost more than aluminum, titanium, or steel so the usage is highest in military rather than commercial systems at the moment. Military systems, as you know, are driven by performance more than cost. In today's world, commercial systems are very much cost driven. I'd like to underscore the importance of these materials to our defense by pointing out that they are used in substantial quantities on today's modern aircraft, such as the F-15, F-16, F-18 and AV8B. In addition, the B-2 Stealth Bomber, and the new ATF Fighter designs are irrevocably committed to using advanced composites for essentially the entire airframe.

Advanced composites are widely considered to be one of the key technologies for the future, along with superconducting materials, advanced ceramic materials, bio-technology, and artificial intelligence. In addition, the leadership role of the United States advanced composite industry is also unquestioned, and is one of the bright spots in the current controversy about U.S. competitiveness in general, and high-technology competitiveness specifically.

I'd like to address now the subject of advanced composite materials in the context of their danger to worker health. Advanced composite materials are composed of relatively inert fibers surrounded by a plastic matrix. The matrix polymer is the product of the chemical reaction of several complex organic chemicals. These organic constituents have chemical similarities to body tissue, as do foods and medicines. In the vast majority of cases, workers who produce advanced composite parts use prepreg material. Prepreg (which is short for pre-impregnated) is a thin sheet of fibers with a mixture of the unreacted, organic chemicals required to form the matrix polymer already spread through the fiber sheet in just the right amount. The workers cut patterns from the prepreg sheets and stack them carefully on molds. The result is heated under pressure until the matrix chemicals have reacted (cured) and the part is formed. In general, it is the handling and curing of the unreacted prepreg which gives rise to health concerns. Later trimming, and drilling operations pose additional but more minor concerns, mostly with nuisance dust, and are easily controlled.

In the early days of the industry, aircraft were made of wood and doped fabrics put together with adhesives. In those days, it was common for the workers to use unreacted organic chemicals. Then the industry turned to metal, mostly aluminum, as its primary material of construction. Metals arrive at the workers bench already reacted, and relatively inert. There are numerous worker health and safety concerns with metal construction, including toxicity concerns with the heavy metals used in corrosion coatings, noise levels in mechanical riveting, and the physical dangers of rapid, high-pressure stamping machines for sheet metal parts. These are well-understood and well-controlled in our modern factories. Now, of course, the wheel of time and progress is returning to the use of organic chemicals, as constituents in advanced composite materials, in the aerospace industry, and new work habits and precautions must be learned again to ensure an acceptable level of worker health and safety.

I do not believe that advanced composite materials are inherently more dangerous to worker safety than metals. But I do recognize that the dangers between these two types of materials are very different, and that workers need help in understanding how to safely deal with composites. The suppliers of advanced composite materials long ago recognized the need to help our customers understand worker safety concerns with these materials. To that end, working through SACMA, the suppliers began collecting and summarizing existing data on health effects and recommended precautions from their member companies in 1986. The resulting compendium, in the form of a health effects white paper, was published early this year and has been made available to the subcommittee. In addition, SACMA and AIA have formed a joint task

force to look at health effects, safety procedures, and engineering controls necessary to minimize worker exposure risk to health dangers in using advanced composites.

The genesis of the concerns about health effects in using advanced composites was two widely-reported cases in the aerospace industry, one at a Boeing facility and one at a Lockheed facility. These two recent cases are of great concern to both the composite material industry and to the aerospace industry. Were these two instances just aberrations? Or can we expect more such instances around the world? What caused these workers symptoms? What can be done to minimize the chances of future problems? The Suppliers of Advanced Composites recognize our obligation to help resolve these questions and are willing and able to work with both our customers and the government to provide information, fund research, adopt new procedures - or whatever else is required - to ensure that our high-performance products are safe for use.

In summary, I have tried to give you a picture of an important new class of materials which allow us to construct some things not feasible with other materials, and in the broader case, to improve the performance, durability, and safety of many other products. These new advanced composite materials are rapidly expanding in their usage volume and can be expected to continue to do so for another 25 years. Advanced composites are based on complex organic chemicals, and so give rise to different health concerns and procedures than conventional aerospace materials. New work procedures are required, and workers must be trained in these procedures and the reasons for them.

ENVIRONMENTAL DEFENSE FUND

Rockridge Market Hall
5655 College Avenue
Oakland, CA 94618
(415) 658-8008
(415) 658-0630 FAX

TESTIMONY OF DR. DIANE C. FISHER

STAFF SCIENTIST

National Headquarters

257 Park Avenue South
New York, NY 10010
(212) 505-2100

1616 P Street, NW
Washington, DC 20036
(202) 387-3500

1405 Arapahoe Avenue
Boulder, CO 80302
(303) 440-4901

1108 East Main Street
Richmond, VA 23219
(804) 780-1297

128 East Hargett Street
Raleigh, NC 27601
(919) 821-7793

before the

U.S. SENATE

ENVIRONMENT AND PUBLIC WORKS COMMITTEE

SUBCOMMITTEE ON TOXIC SUBSTANCES

July 5, 1989

I am Dr. Diane Fisher, chemist and staff scientist with the Environmental Defense Fund, a national, non-profit organization of over 100,000 members nationwide. EDF's West Coast Office, with several other organizations, played a leading role in the drafting and passage of California's Proposition 65, also known as the Safe Drinking Water and Toxic Chemical Enforcement Act of 1986.

The main points of my testimony today are:

1) Existing standards limiting employee exposure to chemicals in the workplace (Permissible Exposure Levels, or PELs) are grossly inadequate to protect employees from a significant risk of cancer or reproductive harm (birth defects, infertility, etc.).

2) Existing OSHA warning requirements are not adequate to warn employees about the very large cancer or reproductive risk posed by exposure to chemicals at or significantly below the PEL.

3) California's Proposition 65, as applied in the workplace, has the potential to plug the holes in existing workplace warning requirements, providing employees with warnings whenever their health is significantly threatened by exposures to carcinogens or reproductive toxicants.

4) Proposition 65 contains structural innovations which give employers incentives to see to it that warnings are actually effective, and to comply in advance of formal enforcement action.

FAILURE OF OSHA STANDARDS AND WARNINGS TO PROTECT EMPLOYEES

Existing PELs Do Not Protect Employees From Cancer or Reproductive Toxicity

OSHA regulations have established levels of chemicals known as "Permissible Exposure Limits", or PELs. The average concentration of each chemical in the air in a workplace cannot exceed this value during the course of an 8 hour workday. Although the OSHA list of PELs includes many

carcinogens, the standards (as shown in Table I, for chemicals also on the Proposition 65 list) are grossly inadequate to protect employees from the risk of cancer. The first column in Table I shows daily doses of several chemicals which have been calculated to cause "no significant risk of cancer", as defined by regulations implementing Proposition 65. (These regulations define "significant risk" as 1 or more cancer death per 100,000 individuals. This is 10 times higher than the 1 in a million standard commonly cited by EPA, FDA, and other regulatory and scientific bodies.) The third column shows the allowable daily exposure under existing PEL's. The allowable exposures generally exceed levels which cause a significant risk of cancer by factors of more than 1000, and in some cases by factors greater than a million.

OSHA warning requirements fail to warn in many situations where the risk of cancer is significant

As OSHA interprets the current Hazard Communication Standards (EDF does not necessarily agree with this interpretation), warnings are required only when the material used in a manufacturing process contains more than 1% of a reproductive toxicant, or more than 2% if the substance exists as an impurity in the mixture, or more than 0.1% of a mixture if the hazardous substance is a carcinogen. This warning threshold bears no relationship whatsoever to the amount of the chemical which actually poses a health threat. This will depend on the potency of the chemical, and the amount to which the employee is likely to be exposed. For chemicals which are potent in small doses, such as dioxin, the OSHA warning threshold may be orders of magnitude above a level which poses a very large risk of cancer or reproductive harm.

The result of inadequate PELs combined with warnings which are triggered in an arbitrary, non-health based manner is that employees may be

exposed to carcinogens or reproductive toxins in amounts which significantly threaten their health, without receiving any warning whatsoever.

Even when OSHA warnings are triggered, they may be ineffective.

Warnings about the hazards of chemicals in the workplace, when they are communicated at all, are generally relayed via Material Safety Data Sheets (MSDS). MSDS have been criticized as not being very effective in getting the message across to the employee about chemical hazards.

PROPOSITION 65--GENERAL DESCRIPTION AND PROGRESS TO DATE

Proposition 65 is similar to previous toxics legislation in most respects, but differs in a few key features. It requires the Governor, in consultation with scientific experts, to list chemicals which cause cancer or reproductive toxicity (e.g. birth defects, infertility). For these chemicals only, two rules apply: 1) do not expose anyone to these chemicals without providing clear and reasonable warning and 2) do not discharge to a source of drinking water. There is a 12 month grace period after listing before the warning requirement applies, and 20 months before the discharge ban applies, to give businesses time to bring themselves into compliance. (Only the warning requirement is relevant to the current discussion, so the discharge ban will not be described further.)

Like most toxics legislation, Prop 65 recognizes that some chemical exposures may be so small as to pose an insignificant risk, and exposures which are below a defined "safety" level are exempt from the Proposition's provisions. This level has been defined by regulations for carcinogens as the amount of chemical which will cause less than 1 additional cancer death per

100,000 exposed individuals (ten times higher than the standard EPA and FDA claim to adhere to), and 1/1000th of the "No Observable Effect Level" for reproductive toxins.

Proposition 65 contains a key structural innovation from previous toxics legislation. Previously, the burden was on government to show that an exposure to a chemical exceeded prescribed safety levels. In the absence of a numerical standard to define this level for each chemical, no enforcement could occur, and effectively any amount of the chemical was assumed to be safe. Proposition 65 shifts the burden of proof to the regulated business to show that a chemical exposure is below the line. Proposition 65 effectively assumes that no exposure is safe, until there is enough evidence to demonstrate otherwise.

The result of this shift has been dramatic. Before, regulated businesses had an incentive to delay the line-drawing process for as long as possible, debating technical issues ad infinitum, since enforcement would be effectively stymied in the meantime. With the shift in burden of proof, regulated industry has faced the need of showing that the same situation is "below the line"--and suddenly has been eager for regulations that define and quantify those lines. As a result, California has managed to draw clear, quantity-specific exposure limits for more chemicals in the first twelve months than EPA has managed in the previous 12 years. Unlike the Permissible Exposure Limits (PELs) established under OSHA, which at best may protect against acute toxicity, Proposition 65 levels are established with the goal of reducing carcinogenic or reproductive risk.

Proposition 65 also provides for daily fines of \$2500 per exposure per day for violation of the warning requirement, once the 12 month grace period has elapsed. The Proposition can be enforced by direct citizen suit, with 25%

of the penalties to be awarded to the citizens who successfully bring a suit. Since absence of a regulatory level does not defeat enforcement, the warning requirement is guaranteed to become effective 12 months after a chemical is listed, and the longer a business is in violation, the greater the financial liability should this violation be discovered. The possibility of citizen suits increases the likelihood that violations will be discovered. Thus, businesses have a major incentive to become self-policing, bringing themselves into compliance in advance of any enforcement action.

Although Proposition 65 gives businesses a great deal of freedom in choosing a warning method, it also shifts the burden of proof to industry to demonstrate that the warning is actually accomplished. In other words, simply giving an employee a Material Safety Data Sheet will not necessarily fulfill the warning requirement unless the employer can demonstrate that this warning method actually gets the message across. It is also the employers' responsibility to demonstrate that levels of the chemical in question fall below a level which would trigger warning if he wishes to avoid warning at all.

Although warning is the only requirement under this part of the law, it is intended to provide a strong incentive for businesses to reduce toxic exposures, rather than have to give cancer or birth defect warnings to customers or employees. In many instances, Proposition 65 appears to be having exactly the intended effect. A few examples include a major Mexican canner/importer which has opted to no longer use lead seamed cans, Sunoco, which has reformulated the inks it uses in its plastic grocery bags, and a major manufacturer of electrical equipment which has reformulated some products to avoid the use of cadmium, a Proposition 65 chemical. Although these efforts appear to be focussed primarily on avoiding warnings on consumer products, they are likely to benefit the employees in each of these industries by reducing the

use of toxic chemicals which pose a threat to their health. As one industry spokesperson recently acknowledged: "Businesses are reviewing their product lines, they are seeking alternatives to Proposition 65 chemicals, and risk from these chemicals is being reduced."

PROPOSITION 65 AS APPLIED IN THE WORKPLACE

There have been numerous attempts, some successful, to weaken Proposition 65, as described in more detail in the testimony of my co-panelist, Al Meyerhoff of the Natural Resources Defense Council (NRDC).

The Environmental Defense Fund (along with NRDC, the California Labor Federation, AFL-CIO, and other groups) participated in a petition to the OSHA Standards Board of the Department of Industrial Relations (DIR) to make Proposition 65 warning requirements part of the state OSHA plan, to protect them from the threat of federal pre-emption. Despite a staff recommendation to grant the petition, the Board voted 4 to 1 to deny it. The staff report (attached) details several ways in which Proposition 65 would strengthen the OSHA Hazards Communication Standard. Below is EDF's analysis of how Proposition 65 Standard would strengthen OSHA standards, with corroborative statements quoted from the DIR staff report.

Proposition 65 provides warnings whenever the health of the employee is threatened by chemical exposures.

One of Proposition 65's greatest strengths is that warnings are triggered purely on the basis of the risk posed to human health by the chemical exposure in question. This assures that employees will receive warnings

whenever their exposure to a carcinogen or reproductive toxin significantly threatens their health, even if the harmful substance is only a minor component of a mixture.

As noted in the DIR Standards Board staff report:

Proposition 65 would require some warnings before exposures to a carcinogen or reproductive toxin, when the Hazard Communication Standard would not require warnings because those levels of the carcinogen or reproductive toxin did not exceed the one-percent, two-percent, or one-tenth percent levels. The Hazard Communication Standard requirements are not triggered for carcinogens unless they are present in a concentration greater than 0.1 percent, while Proposition 65 requires the employer or responsible person to show that an exposure poses no significant risk assuming lifetime exposure at the level in question.

Proposition 65 also takes a more even-handed, consistent approach to warnings. The same quantities of chemicals which trigger consumer warnings trigger workplace warnings. Under the Proposition, it is not allowable to expose workers without warning to amounts of chemicals which are considered unacceptable for the general public.

Proposition 65 makes the employers responsible for assuring that warnings are effective.

Currently, warnings about the hazards of chemical exposure in the workplace often take the form of "Material Safety Data Sheets", or MSDS. These have been criticized as being an ineffective means of communicating hazards.

Under Prop 65, it is the responsibility of the employer to see to it that the message about the hazards of specific chemicals actually gets across to the employee. MSDS are only acceptable if they accomplish their purpose. If not, the employer must find some other, more effective means of educating

the employees about the risks to which they are exposed. The shift in burden of proof, and the large financial liabilities to which businesses expose themselves for non-compliance give them a major incentive to do their own quality control on the effectiveness of their hazard communication programs, rather than waiting for enforcement action.

This shift in focus to the effectiveness of warnings is also a major change from other statutes. This frees the regulator from devising detailed prescriptions of exactly what information the warnings should contain, and shifts responsibility for success of the program to those in the best position to conduct oversight and modify the hazard communication program as needed.

Proposition 65 has fewer exemptions

OSHA's Hazard Communication Standard contains numerous exceptions, whereas the only exemptions to Proposition 65 are to public agencies and to very small businesses.

As noted by the DIR staff:

The exceptions under the scope and application of the Hazard Communication Standard are numerous.... Proposition 65 does not apply to an exposure for which federal law governs warning in a manner that preempts state authority, but it has no exemptions similar to those in the Hazard Communication Standard. Rather it exempts public agencies and businesses with fewer than 10 employees.

CONCLUSION

Proposition 65, as applied to the workplace, has the potential to fill serious gaps in OSHA Hazard Communication requirements. Because Proposition 65 warnings are health-based, rather than product based, they guarantee that employees will receive warnings whenever their health is threatened by listed carcinogens or reproductive toxicants. Proposition 65's shift in burden of proof makes it more likely that the warnings will actually be effective, since

the employer has an incentive to monitor effectiveness and alter the program accordingly. Proposition 65's standards should be incorporated into California's state OSHA plan, and Proposition 65-like mechanisms should be considered for inclusion in Federal OSHA standards. This will strengthen employee protection; and guarantee that their "right-to-know" about hazards which face them in the workplace is not being violated.

Table I
Comparison of Permissible Exposure Levels (PEL) to "Significant Risk" Levels

	10 ⁻⁵ levels ug/day	OSHA PEL mg/m ³ *	OSHA PEL ug/day
acetaldehyde	90.000	180.000	1,800,000
acrylonitrile	3.000		45,000**
aldrin	0.040	0.250	2,500
asbestos (as number of fibers)	(100)		(2,000,000)**
benzene	20.000		3,000
benzo(a)pyrene (as coal tar pitch volatiles)	0.060	0.200	2,000
1,3-butadiene	0.400	2200.000*	22,000,000*
carbon tetrachloride	5.000	12.600	126,000
chlordane	0.500	0.500	5,000
chloroform	9.000	9.780	97,800
chromium (hexavalent compounds)	0.001	0.100**	1,000**
coke oven emissions	0.300		1,500**
ddt	2.000	1.000	10,000
dichloromethane (methylene chloride)	50.000		3,600,000**
dieldrin	0.040	0.250	2,500
2,4-dinitrotoluene	2.000	1.500	15,000
epichlorohydrin	70.000	8.000	80,000
ethylene dibromide	3.000		1,500,000**
ethylene dichloride (dichloroethane)	9.000		40,000**
ethylene oxide	2.000		18,000**
heptachlor	0.200	0.500	5,000
nickel (Prop. 65 covers refinery dust)	0.800	1.000	10,000
tetrachloroethylene	14.000	170.000	1,700,000
toxaphene	0.600	0.500	5,000
trichloroethylene	60.000	270.000	2,700,000

All exposure levels estimated by assuming a worker breathes 10 m³ of air per 8 hour workday.

+ Values are 8 hour Time Weighted Averages (TWA) from "Air Contaminants--Permissible Exposure Limits" Title 29 Code of Federal Regulation Part 1910.1000. Occupational Safety and Health Administration, 1989.

++ Value from "Risk Assessment for Carcinogens under California's Proposition 65", Lauren Zeise, et al. Presented at the Annual Meeting of the American Association for the Advancement of Science, Jan. 16, 1989.

* Transitional Limit. Final Rule Limit in process of 6(b) rulemaking.

** Transitional Limit. No final rulemaking process reported.

OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

1006 FOURTH STREET
SACRAMENTO, CA 95814-3372
(916) 322-3640



Proposed Petition Decision of the Occupational Safety and Health Standards Board (Petition File No. 268)

Introduction

The California Occupational Safety and Health Standards Board received a petition on February 7, 1989 from John F. Henning, Executive Secretary - Treasurer, on behalf of the California Labor Federation, AFL-CIO; Natural Resources Defense Council; Environmental Defense Fund; Public Citizen, Inc; Campaign California; and Bernardo Huerta (Petitioners). Petitioners requested that "the Occupational Safety and Health Standards Board and the Department of Industrial Relations (hereafter 'the Board') amend its existing regulations, or adopt such other regulations, and otherwise take all such action as is necessary to assure that the California State Plan for Occupational Safety and Health ('state OSHA plan') includes and is consistent with the 'clear and reasonable warning' requirement, and other pertinent provisions, of Proposition 65, California Health and Safety Code Sections 25249.6 to 25249.8, and 25249.10 to 25249.13."

Labor Code Section 142.2 permits interested persons to propose new or revised regulations concerning occupational safety and health and requires the Board to consider such proposals and to render its decision no later than six months following their receipt. Further, as required by Labor Code Section 147, any proposed occupational safety or health standard received by the Standards Board from a source other than the Division of Occupational Safety and Health (Division) must be referred to the Division for evaluation, and the Division must submit a report on the proposal within 60 days of its receipt.

The Petition

Petitioners contend that:

- (1.) Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986) constitutes state law governing occupational safety and health;
- (2.) Labor Code Section 50.7(a) as amended by Proposition 97 (California Occupational Safety and Health Restoration Act) requires the state plan to be consistent with the provisions of state law governing occupational safety and health;
- (3.) "Pursuant to Article XIV, Section 4, of the California Constitution, state jurisdiction over worker safety and health should not be limited, eliminated, or otherwise restricted.

unless absolutely required by Federal Constitution." (Emphasis added);

(4.) Health and Safety Code Section 25249.12 (Proposition 65) provides "each agency so designated may adopt and modify regulations, standards, and permits as necessary to conform with and implement the provisions of this chapter and to further its purposes." (Emphasis added);

(5.) Executive Order D-61-87 identifies the Department of Industrial Relations as one of the designated agencies;

(6.) The federal Hazard Communication Standard 29 CFR 1910.1200 is designed to require employers to warn employees of potential exposure to hazardous materials in their workplace including some of the carcinogens and reproductive toxins subject to Proposition 65;

(7.) "...[W]hen a federal OSHA standard has been issued with respect to any issue under the federal Act, a state may regulate with respect to that issue if it has incorporated the state law into the OSHA plan. Failure to amend the state OSHA plan subjects Proposition 65 to the possibility of preemption by Sec. 18 of the federal Act.";

therefore,

"...the Board and the Department must amend any present regulations, and adopt new regulations, if necessary, in order to amend the state OSHA plan to incorporate the applicable provisions of Proposition 65 and its implementing regulations."

The petition requests that the Standards Board as well as the Department of Industrial Relations take action to ensure the state plan is amended, incorporating the clear and reasonable warning provisions of Proposition 65.

Discussion

The petitioners state that Labor Code section 50.7(a), as amended by Proposition 97, requires the incorporation of Proposition 65 and the regulations adopted by the Health and Welfare Agency to implement Proposition 65. Labor Code section 50.7(a) provides in relevant part: "The state plan shall be consistent with the provisions of state law governing occupational safety and health, including, but not limited to, Chapter 6 (commencing with Section 140) and chapter 6.5 (commencing with Section 148) of Division 1, and Division 5 (commencing with Section 6300), of this code." (Emphasis added.)

Two issues are initially raised:

1. Is Proposition 65 a "state law governing occupational safety and health"?
2. Are current Labor Code provisions and occupational safety and health regulations in Title 8 "consistent" with Proposition 65?

Issue 1: Is Proposition 65 a "state law governing occupational safety and health"?

Labor Code section 50.7(a) and the other parts of Proposition 97, do not explicitly mention Proposition 65, nor is there an explicit statement that the state plan must be consistent with Proposition 65, despite Proposition 65's having been enacted two years before Proposition 97. Also, Proposition 65 does not specifically state that it applies to occupational safety and health. Thus, one can assert that Proposition 65 is not a law governing occupational safety and health.

However, Labor Code section 50.7(a) specifically provides that the state plan must be consistent with state laws governing occupational safety and health, "including but not limited to" the California Occupational Safety and Health Act. Thus, laws governing occupational safety and health are not limited to statutes and regulations within the Cal/OSHA program.

Proposition 65-Health and Safety Code section 25249.6 provides:

"No person in the course of doing business shall knowingly and intentionally expose any individual to a chemical known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual, except as provided in Section 25249.10." (Emphasis added.)

Proposition 65-Health and Safety Code section 25249.11(b) provides in part:

"Person in the course of doing business" does not include Public Agencies and any person employing fewer than ten employees in his business";... (Emphasis added.)

Since Proposition 65-Health and Safety Code section 25249.11(b) explicitly excludes persons employing fewer than ten employees, it follows that any person employing ten or more employees is included, and is thereby required to comply with the clear and reasonable warning requirement in Proposition 65-Health and Safety Code section 25249.6.

An employer for purposes of the California Occupational Safety and Health Act is defined as a state, local or public agency as well as "[e]very person...which has any natural person in service." (Labor Code section 3300.) Thus, a "person in the course of doing business" for purposes of Proposition 65-Health and Safety Code section 25249.6 appears to come within the definition of an employer within the meaning of the California Occupational Safety and Health Act, with certain exceptions.

Proposition 65-Health and Safety Code section 25249.6 requires an employer to provide a clear and reasonable warning to "any individual." In this context, "individual" can be defined as a human being. Since employees are human beings, they must also be considered "individuals" within the meaning of Proposition 65-Health and Safety Code section 25249.6, unless some other provision of Proposition 65 either explicitly or implicitly exempts or excludes employees from the meaning of "individual".

Therefore, Proposition 65 mandates employers' obligations to their employees by requiring employers, in the course of doing business, to give a clear and reasonable warning to their employees before they expose them to a carcinogen or reproductive toxin. To that extent, Proposition 65-Health and Safety Code section 25249.6 can be considered a state law governing occupational safety and health.

Issue 2: Is the current state plan, including Labor Code provisions and occupational safety and health regulations in Title 8, "consistent" with Proposition 65?

Labor Code section 50.7(a), as amended by Proposition 97, requires the state plan to be "consistent" with state laws governing occupational safety and health. Petitioners argue that this requires the Board to adopt regulations to incorporate Proposition 65 provisions into the state plan by adopting Proposition 65 regulations in Title 8 of the California Code of Regulations.

The state plan includes Labor Code provisions, including the California Occupational Safety and Health Act (Act), as well as regulations in Title 8, California Code of Regulations. Therefore, the state plan includes the Act, the Hazardous Substances Information and Training Act and the Hazard Communication Standard (Title 8, California Code of Regulations, Section 5194).

"Consistent" can be defined as agreeing or accordant, compatible, not self-opposed or self-contradictory; adhering to the same principles; or cohering. Thus, it can be argued that current Cal/OSHA provisions are, in fact, consistent with Proposition 65 because provisions within the state plan require warning of the hazards of carcinogens and reproductive toxins. The Hazard Communication Standard specifically requires material safety data sheets (MSDS's) which must address the specific hazards of hazardous substances, including carcinogens and substances which are reproductive toxins and, further, requires that employers train employees with respect to these hazards.

Moreover, it can be argued that the main purpose of Proposition 97 was to reinstate funding for enforcement of California

occupational safety and health regulations in the private sector. To this end, "consistent" was meant to require the state plan to include the exercise of authority granted by occupational safety and health laws in the private sector. Thus, it can be argued, that the state plan is not inconsistent, i.e., incompatible, with Proposition 65. It constantly adheres to the same principles as Proposition 65 by requiring warnings to employees about exposure to carcinogens and reproductive toxins and applies to the private sector as well as the public sector.

This argument supports denial of the petition. There is no necessity to incorporate Proposition 65 into Title 8 because the Hazard Communication Standard and the Hazardous Substances Information and Training Act already provide the consistency required by Proposition 97.

However, there are some important differences between Proposition 65 and the Hazard Communication Standard. First, Proposition 65 provides protection to employees not now provided by the Hazard Communication Standard. Proposition 65 requires a warning unless the employer can show that the employee's exposure to a carcinogen presents no significant risk, or that the employee's exposure to a reproductive toxin will have no observable effect, assuming exposure at one thousand times the level in question for the reproductive toxin. In contrast, an employer's obligations under the Hazard Communication Standard do not arise unless the employee is exposed to a mixture or product in which the presence of a carcinogen or reproductive toxin is one percent or more, two percent of a mixture or product if a hazardous substance exists as an impurity in the mixture, or one-tenth of one percent of the mixture or product if the hazardous substance is a carcinogen.

In essence, Proposition 65 would require some warnings before exposures to a carcinogen or reproductive toxin, when the Hazard Communication Standard would not require warnings because those levels of the carcinogen or reproductive toxin did not exceed the one-percent, two-percent, or one-tenth-of-one-percent levels. The Hazard Communication Standard requirements are not triggered for carcinogens unless they are present in a concentration greater than 0.1 percent, while Proposition 65 requires the employer or responsible person to show that an exposure poses no significant risk assuming lifetime exposure at the level in question. The term "no significant risk" is not defined within the statute, and is thus subject to interpretation. [The Health and Welfare Agency has interpreted "no significant risk" for their purposes to mean one excess case of cancer in an exposed population of 100,000 (or 10^{-5})].

For reproductive toxins, the Hazard Communication Standard trigger level is 1.0 percent concentration or greater, while Proposition 65 specifies that the exposure have no observable

effect assuming exposure at one thousand times the level in question.

The Hazard Communication Standard does provide a caveat to the trigger concentrations which states: "If the employer has evidence to indicate that a component present in the mixture in concentrations of less than one percent (or in the case of carcinogens, less than 0.1 percent) could be released in concentrations which would exceed an established permissible exposure limit or ACGIH Threshold Limit Value, or could present a health hazard to employees in those concentrations, the mixture shall be assumed to present the same hazard." (8CCR, Section 5194(d)(5)(D))

From a practical standpoint, since an employer has an obligation to determine employee exposures and reduce them to or below any applicable permissible exposure limits (8CCR, Section 5155), the employer would be required to comply with the Hazard Communication Standard provisions when such mixtures contained carcinogens or reproductive toxins (or any health effects as defined) below the trigger levels. This, in effect, is a tiered approach that recognizes that warning and training of employees must be provided when employees are exposed above the established Permissible Exposure Limits (PEL) or Threshold Limit Values (TLV), but that it will often be provided when employees are not overexposed. Title 8, California Code of Regulations, Section 340.2 reinforces and is consistent with this approach in that it requires employers to notify employees in writing when they have been overexposed, and of the corrective action being taken by the employer.

The controlling factor, then, for the Hazard Communication Standard is that whenever an employee is overexposed in the work setting to an established PEL or TLV (which is considered to be reasonable and acceptable exposure criteria for that specific subpopulation within the community), they shall be warned, trained, and provided information, regardless of the percentage concentrations of the hazardous substance(s) in the container. Even when an employee is not overexposed, the 1.0 and 0.1 percent concentration criteria will apply to trigger the warning, training, and information requirements.

The trigger levels of Proposition 65 are equivalent to concentrations that could range in some cases as much as 3, 4, or 5 times lower than existing PEL's. This, in effect, is requiring the employer (in an occupational setting) to provide a warning to employees when the employer knows a listed compound is present in the workplace regardless of whether an overexposure exists. At the same time, the employers are not required to tell employees how such an exposure affects them, the consequences, the corrective action to be taken, if any, or how it relates to other established exposure criteria such as the PEL's.

Comparing the trigger levels of Proposition 65 to the PEL's is difficult for several reasons. First, specific concentrations below which there is no significant risk under Proposition 65 have been developed for roughly 48 substances, while there are nearly 800 substances with PEL's. Second, the units of measurement are different: micrograms per day (ug/day) under Proposition 65 versus milligrams per cubic meter (mg/m³) or parts per million (ppm) for PEL's. Conversion between the units is not particularly difficult, but Proposition 65 concentrations assume exposure through three routes of exposure: dermal, oral, and inhalation. The PEL's are established for the inhalation route of exposure but do in some instances acknowledge the significance of dermal exposure through the use of "skin" notations. Any conversions between the two, for comparative purposes, would need to address the route(s) of exposure, and frequency and duration of exposure. Third, the data upon which the "no significant risk" levels and "no observable effect" levels are based are seldom toxicological data obtained by direct observation. That is, at such low concentration levels, animal tests are rarely performed. The values are often extrapolated from higher doses through computerized mathematical models. For carcinogens, the model of choice is the linearized multistage model, a no-threshold model. The advantage to this model is that it does not underestimate the risk. The disadvantage is it may overestimate the risk by up to a million fold factor. Overestimating risk, though, errs on the side of worker safety.

There are other differences between Proposition 65 and the Hazard Communication Standard. The exceptions under the scope and application of the Hazard Communication Standard are numerous and, for the most part, defer to other existing federal or state laws that encompass overlapping or duplicative requirements. Proposition 65 does not apply to an exposure for which federal law governs warning in a manner that preempts state authority, but it has no exemptions similar to those in the Hazard Communication Standard. Rather it exempts public agencies and businesses with fewer than 10 employees and has a 12 month grace period for compliance from the time a substance is listed on the Governor's list. Proposition 65 also does not apply to an exposure for which the person responsible can show poses no significant risk or has no observable effects.

Both Proposition 65 and the Hazard Communication Standard rely on lists of hazardous substances for which warnings are necessary, but these lists differ. Proposition 65 relies on the Governor's list which, at a minimum, requires substances identified as human or animal carcinogens by the International Agency for Research on Cancer (IARC), the Director's List, and any substance within the scope of the federal Hazard Communication Standard. The Director's list requires, as a minimum, substances listed by IARC, the Environmental Protection Agency (EPA) (pursuant to

specified statutes), airborne chemical contaminants (pursuant to the Standards Board's authority), substances designated by the Director of Food and Agriculture, and substances for which an information alert has been issued by the Hazard Evaluation System and Information Service (HESIS). (Labor Code section 6382)

The Governor's list is currently comprised of 203 chemicals known to the state to cause cancer and 29 reproductive toxins. The Director's list consists of over 800 chemicals that may produce adverse acute or chronic health effects including carcinogenicity, mutagenicity, neurotoxicity, or other organ damage or effects. The list also includes health hazards listed in the federal Hazard Communication Standard such as toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, and agents which act on the hematopoietic system or damage the lungs, skin, eyes, or mucous membranes.

Although the Director's list covers a broader range of health hazards and is roughly four times larger, the Governor's list contains 66 carcinogens and 18 reproductive toxins not currently included on the Directors list. The Director's list is to be updated biannually, and the Governor's list is updated upon the determinations of the state's qualified experts at least once per year.

Differences between warning requirements of Proposition 65 and the state plan also exist.

Proposition 65 requires a "clear and reasonable warning" before exposure to a carcinogen. The contents of the warning are not set forth in Proposition 65. However, it should be noted that the Health and Welfare Agency has determined for the purposes of its regulations that clear and reasonable warnings are divided into 3 distinct applications. Those include: (1) warnings for exposures to consumer products, (2) warnings within an occupational setting where employees are exposed, and (3) warnings for environmental exposures. (22 CCR, Section 12601)

The Hazard Communication Standard requires employers to train employees as to the hazards of chemicals to which they may be exposed, not only to those chemicals to which they will be exposed (as Proposition 65 would require). The broader provisions of the Hazard Communication Standard require, in addition to training, labeling and other forms of warning, that MSDS's be provided to employees and that the employer develop a written hazard communication program.

Thus, these differences, particularly the difference between employer obligations, can be considered to erode the argument of consistency between Proposition 65 and the Hazard Communication Standard.

It can be argued that the Petitioner's interpretation of Labor Code section 50.7(a), as amended by Proposition 97, is not necessarily correct. For example, the Legislature specifically authorized the Department of Food and Agriculture to adopt and enforce regulations providing safe use of pesticides and safe working conditions for farmworkers, pest control applicators, and other persons handling, storing, or applying pesticides (Food and Agriculture Code sections 12980, 12981 and 12982). Petitioner's interpretation of Labor Code section 50.7(a) could require the Standards Board to incorporate the Department of Food and Agriculture's regulations for pesticide safety into Title 8 since those regulations address occupational safety and health, even though the regulations could not be enforced by the Division.

However, Proposition 65 did not specifically authorize any one particular agency to have sole authority to adopt and enforce regulations. Thus, the Board's adoption of Proposition 65 regulations and the Division's enforcement of those regulations is not explicitly or implicitly prohibited by Proposition 65, as it is by sections 12980-12982 of the Food and Agriculture Code.

Finally, the California Supreme Court has ruled that the California Occupational Safety and Health Act must be given a liberal interpretation for the purpose of achieving a safe working environment. (Bendix Forest Products Corp. v. Division of Occupational Safety and Health (1979) 25 Cal.3d 465, [158 Cal.Rptr. 882, 600 P.2d 1339].) Proposition 65 adds protection to employees not otherwise provided by current occupational safety and health laws or regulations. Moreover, the preamble to Proposition 97 establishes that occupational exposures and exposures to the community-at-large are related.

Section I of the preamble states:

"SECTION 1. The people of California find and declare that:

- (1) Californians have the right to be effectively protected from injury, illness, and death in the workplace, and from the hazards of exposure to toxic substances on the job and in the community.
- (2) The restoration of adequate state standards and enforcement policies to reduce exposure to cancer-causing substances, chemicals that cause birth defects, and other toxic materials is in the interest of all Californians.
- (3) Catastrophic releases of such contaminants into our communities can best be prevented through the restoration of effective state safety and health

practices in the workplace, including proper equipment and maintenance policies, employee training, and safe handling of toxic materials". (Emphasis added.)

Thus, Proposition 97 was adopted, in part, because occupational exposure to carcinogens, reproductive toxins and other hazardous materials is related to community exposure.

Proposition 65 addresses community exposure. The preamble to Proposition 65 specifically provided:

"The people of California find that hazardous chemicals pose a serious threat to their health and well-being, that state government agencies have failed to provide them with adequate protection, and that these failures have been serious enough to lead to investigations by federal agencies of the administration of California's toxic protection programs. The people therefore declare their rights:

...

- (b) To be informed about exposures to chemicals that cause cancer, birth defects, or other reproductive harm.

.... "(Emphasis added.)

The Hazard Communication Standard became effective on November 25, 1985, and was in existence when the voters adopted Proposition 65, including its preamble. Although Proposition 65 appears to be addressed more to public or consumer exposure than to occupational exposure, occupational exposures are, nevertheless, included within Proposition 65. — (See discussion of Issue 1, above.)

Thus, a liberal interpretation of "consistent" in Labor Code section 50.7(a), indicates that the Board should adopt regulations providing the added protection of Proposition 65.

Proposition 65 presumes risk, requiring a warning, from any exposure to a carcinogen or reproductive toxin, unless an employer can show no significant risk from a carcinogen or no observable effect from a reproductive toxin. The state plan, including the Hazard Communication Standard, imposes no obligation requiring a warning from any exposure until the percentage limits will be exceeded. In this sense, there appears to be an inconsistency.

If, in fact, the state plan is not consistent with Proposition 65, within the meaning of Labor Code section 50.7(a), and

Thus, although the Health and Welfare Agency may be the principal agency to implement Proposition 65, the Board, as the sole agency authorized to adopt occupational safety and health standards, should retain its discretion to determine the substance of the standards incorporating Proposition 65. This construction will preserve the Board's authority and discretion within the occupational safety and health setting, while maintaining Health and Welfare Agency's role as the principal agency in implementing Proposition 65 in non-occupational settings.

Interpreting Proposition 65 to require Health and Welfare Agency's regulations to take precedence would render the Board's authority ministerial. The Board would be going through the academic steps of adopting regulations even though it would have no authority to address the substantive aspects. Nothing in Proposition 65 or in Proposition 97 indicates that it was the intent of either proposition to reduce the Board's discretion to determine the substance of an occupational safety and health regulation.

The Board's authority allows it to interpret and make specific those provisions of Proposition 65 it deems necessary to be consistent with other existing statutes and regulations affecting this subject. Hence, incorporation of Proposition 65's implementing regulations (as adopted by the Health and Welfare Agency) through amendment or adoption is inappropriate. The Board should exercise its independent authority as the sole agency to adopt occupational safety and health regulations to implement Proposition 65 in places of employment.

Issue 4: How are the inconsistencies between Proposition 65 and the state plan to be resolved?

Proposition 65-Health and Safety Code section 25249.13 provides:

"Nothing in this chapter shall alter or diminish any legal obligation otherwise required in common law or by statute or regulation, and nothing in this chapter shall create or enlarge any defense in any section to enforce such legal obligation. Penalties and sanctions imposed under this chapter shall be in addition to any penalties or sanctions otherwise prescribed by law." (Emphasis added.)

Thus, the Hazard Communication Standard of the state plan is not altered or diminished. Indeed, neither Proposition 65 nor the Hazard Communication Standard provide conflict that would prevent an employer from complying with one while also complying with the other. The warning requirement of Proposition 65 may be interpreted to apply to instances in which the Hazard Communication Standard does not apply. As noted above, the warnings and other measures required by the Hazard Communication

Standard are actually more specific and complete than those required by Proposition 65. Therefore, the interests of employee safety are merely furthered by Proposition 65-Health and Safety Code section 25249.13.

It should be noted that federal law, as well as Labor Code section 142.3, allows the adoption of standards which, when applicable to products which are distributed or used in interstate commerce, are required by compelling local conditions and do not unduly burden interstate commerce (a "product standard"). It is not clear, however, whether Proposition 65 actually imposes a product standard nor is it clear that regulations which may be ultimately adopted would impose a product standard subject to the interstate commerce provision. This issue could affect the state plan's status as an approved plan. Thus, in developing regulations to implement Proposition 65 in an occupational setting, the provisions of the Hazard Communication Standard should be maintained, and care must be taken to ensure that the "product standard" limitation is honored to maintain federal approval of the state plan.

Division's Evaluation

The Division of Occupational Safety and Health submitted an evaluation report dated April 17, 1989. The Division's discussion and recommendation stated that its review of the petition brought to light the differences between Proposition 65 and the Hazard Communication Standard with regard to exemptions from warnings and when warnings are required. Substances such as alcoholic beverages, tobacco, and certain drugs are included in Proposition 65, but are not occupational hazards; Proposition 65 exempts public sector and all private sector employers with fewer than 10 employees.

The Division indicated that it is not understood exactly what was meant by the request that the provisions of Proposition 65 be incorporated into the state plan with regard to development or revision of specific standards. In addition, there may be preemption issues or opposition from Federal OSHA in revising the state Hazard Communication Standard and/or alteration of the state plan to be consistent with Proposition 65. The Division believes these issues require further research and evaluation, but indicated that the arguments of the petition appear to have some validity. The Division recommended the Board grant the petition to the extent that the Division, during revision of the Director's List, be asked to include and footnote the applicable chemicals from the Governor's List of chemicals known to cause cancer or reproductive toxicity. An ad hoc advisory committee consisting of representatives from major segments of the community affected by this regulation should be used to aid the Division. The Division noted that the Board has an opportunity to review the revisions to the Director's List and to modify them.

as necessary before the revised list is adopted by the Director.

The Division also recommended that the ad hoc advisory committee evaluate and discuss other issues relevant to the occupational aspects of Proposition 65 once the Director's List revision has been completed by the committee.

In the meantime, the Division stated that it will begin making arrangements to revise and update the Director's List in anticipation of further directives and recommendations by the Board.

Director's Comments

Ronald T. Rinaldi, Director of the Department of Industrial Relations and State Plan Designee, in a memorandum to Steve Jablonsky, Executive Officer, received April 28, 1989, stated that he will seek an advisory opinion from federal OSHA regarding the inclusion of Proposition 65's provisions into the state plan. The Director observed that the petition has limitations and stated that certain chemicals on the Proposition 65 list are ingested outside the workplace--e.g., alcohol and drugs--and may not be placed on the Director's list because their exposures are not occupational. This appears to be a barrier to any strategy of quick cross-reference or wholesale adoption of the Governor's list into the Director's list. The Director indicated that an advisory committee should be used to explore and consider potential alternatives to these and other problems.

The responsibility for filing State plan change supplements rests with the State Designee. The process for maintaining an approved State plan already requires the inclusion of any standards or revisions to standards adopted by the Standards Board. The Director indicated that transmittals of such change supplements may be intended to alter the State plan, but final authority resides in the Assistant Secretary, U.S. Department of Labor. Therefore, he intends to request an advisory opinion from the Department of Labor on the issues which would require federal approval. Thus, the Petitioners' request for amendment to the State plan, as such, is not an issue properly before the Standards Board and need not be addressed by this Board.

Summary

Issue 1: Is Proposition 65 "state law governing occupational safety and health"?

Yes. It appears that Proposition 65 is a state law that governs occupational safety and health because it controls or mandates actions by employers (at least private employers with ten or more employees) with respect to their employees, regarding exposures in the workplace to toxic substances that present health hazards.

Issue 2: Is the current state plan, including Labor Code provisions and occupational safety and health regulations in Title 8, "consistent" with Proposition 65?

There are two conflicting arguments. The first argument is that there is no substantive inconsistency because Proposition 65 and the Hazard Communication standard adhere to the same principles by requiring warnings to employees about exposures to carcinogens and reproductive toxins.

The counterargument is that differences between the state plan and Proposition 65, including different employer obligations and the different approach to protection provided by Proposition 65, establish that there is not the required consistency. Thus, the Board should adopt or revise regulations implementing Proposition 65.

The Board staff concludes that the second argument is probably more supportable and more consistent with the purposes of the Act.

Issue 3: If rulemaking action is necessary, is the Board required to adopt Health and Welfare Agency regulations implementing Proposition 65?

No. This interpretation of Labor Code section 50.7(a) would render the Board's action of adopting regulations ministerial and ignore the discretion the Board possesses as the sole agency authorized to adopt occupational safety and health regulations.

Issue 4: If rulemaking action is required, how are inconsistencies between Proposition 65 and the state plan to be resolved?

An advisory committee should examine this issue because of its far-reaching implications. The objective in resolving these inconsistencies should allow the Hazard Communication Standard to take precedence whenever both it and Proposition 65 apply, and that each will apply where the other doesn't.

Conclusion and Order

The Occupational Safety and Health Standards Board has considered the petition filed by John F. Henning, Executive Secretary-Treasurer, on behalf of the California Labor Federation, AFL-CIO; Natural Resources Defense Council; Environmental Defense Fund; Public Citizen, Inc.; Campaign California; and Bernardo Huerta. The Petitioners request that the Board take such action as is necessary to assure that the California State Plan for Occupational Safety and Health includes and is consistent with the "clear and reasonable warning" requirement, and other

pertinent provisions of Proposition 65, in the California Health and Safety Code. The Board has also considered the recommendations of the Director's Office, the Division, and Board staff.

For the reasons stated in the Discussion and Summary, the petition is granted to the extent that the Division of Occupational Safety and Health is requested to convene an ad hoc Advisory Committee to assist the Division during its revision of the Director's List to include and footnote the applicable chemicals from the Governor's List of chemicals known to cause cancer or reproductive toxicity. The Division is also requested to evaluate and discuss the issues relevant to the occupational aspects of Proposition 65 and, if appropriate, propose further revisions or regulations for the Board's consideration, recognizing the relationship of Proposition 65 to the state plan, the product standard limitation, and the results of the Director's inquiry and advisory opinion from Federal OSHA.



COUNTY OF LOS ANGELES • DEPARTMENT OF HEALTH SERVICES

313 NORTH FIGUEROA STREET • LOS ANGELES, CALIFORNIA 90012 • (213) 974-



Hearing Testimony

U.S. Senate Subcommittee on Toxic Substances,
Environmental Oversight and Research and Development

Paul J. Papanek, Jr., MD MPH
July 5, 1989

Senator, Members of the Subcommittee:

Let me introduce myself. My name is Paul J. Papanek, Jr., MD MPH. I am a public health physician working for the Los Angeles County Department of Health Services, as Chief of the Toxics Epidemiology Program. My Program carries out surveillance and control of human diseases due to environmental exposure to toxic substances, and as such has a fairly broad role in the area of public health toxicology.

I would like to welcome you to our County with its tropical weather today, and to thank you for allowing me the opportunity to address this hearing on the very important topic of occupational health and safety. As a public health toxicologist, I keep uppermost in my mind that in toxicology the concept of "dose" is always paramount. Although I worry about what we as a society are doing and have done to our land and air and drinking water, I know that the place where people encounter the highest "doses" of toxic chemicals is the workplace, and I believe that we should be focusing a great deal more attention to these exposures. Furthermore, in my time with the County Health Department, I have come to appreciate that we will never get our land and air and water as clean as we want them until we get our workplaces much cleaner, because workplaces are ultimately the source of environmental pollutants.

Senator, my remarks will be brief, because the main ideas in my testimony are in the document I have provided. I would like to stress three key points:

- a) Public health activities in the area of occupational illness and injury prevention are far behind other public health activities, such as control of infectious diseases.
- b) Current expenditures in the area of enforcement of occupational health and safety standards are quite low. In California, whose recently reinstated Cal-OSHA

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Program is more vigorous than the Federal OSHA Program, the annual expenditure for occupational health and safety enforcement as well as preventive outreach is only about 50 cents per worker.

c) Other approaches to control of workplace hazards using a Public Health model, in conjunction with an enforcement model, are likely to be both effective and well accepted by industry.

Let me elaborate briefly on the first point.

First, with regard to the current state of surveillance in this area, there are a great many basic facts about occupational illness and injury which we do not know, but which we should know. We do not know, for example, which are the worst 10 types of workplace exposures in this County which cause the greatest risk of premature death or disability. We do not really know which types of industry have the highest likelihood of significant improvement in the area of occupational safety and health following basic kinds of outreach or education. In this County, we have no agency, whether federal, state, or local, with the resources and mission to respond to reports of clusters of illnesses among workers. In other words, in my opinion we need to be carrying out basic epidemiologic surveillance, a task which in the past has been carried out by the National Institutes for Occupational Safety and Health (NIOSH).

Furthermore, with regard to public health outreach and education in the area of occupational safety and health, we are at a fairly primitive level. To use the example of occupational lead poisoning, one of the oldest diseases known to human-kind, our Program's experience from contact with hundreds of lead-using employers has been that many industrial facilities, particularly smaller facilities, do not know much about their obligations under the OSHA lead standard. In fact, the majority of small employers do not even know that there is such as a thing as an OSHA standard or that they ought to be providing some basic education or other protection for their workers.

What are some solutions?

I think we ought to give much more emphasis to standard public health approaches. The public health model stresses surveillance, outreach, and education, with enforcement as a back-up if the other methods fail. Can this approach work? I believe it can. Our own experience with occupational lead exposure, a disease which should have been stamped out long ago, has been very positive. The great majority of

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employers, once they know that they have some obligations in this area and that some governmental agency is interested in the matter, begin to carry out those obligations voluntarily. The great majority of workers, once they have been told that certain types of activities in the workplace are risky, will stop those activities. Of course, the potential for enforcement must still be present. However in our experience, employers prefer to be helped along to comply voluntarily.

Government, therefore, should be making frequent contacts with employers to let them know about their obligations, and to offer them assistance in carrying out these obligations. The model of the Cal-OSHA consultation service is a good starting point, particularly if coupled with targeted outreach.

NIOSH could probably help in this effort. Frankly, I think that it is difficult to carry out effective surveillance or outreach from a distance, both because cluster investigations require repeated site visits and also because the tools and resources to carry out useful surveillance are different from one region to another. Therefore, if NIOSH were to expand its occupational surveillance function, it ought have regional offices. Let me request that strong consideration be given to establishing a southern California regional NIOSH office.

Finally, we need to be training more occupational safety and health professionals, so that the private sector can help respond to the pressures for change created by this public health approach. In this County skilled industrial hygienists and occupational health physicians and nurses are relatively scarce.

Thank you for your attention to these matters. I am optimistic that with a modest increase in activities in these areas, we can make American workers safer and healthier, and that the environment for all of our residents will improve as well.



Natural Resources
Defense Council

80 New Montgomery
San Francisco, CA 94103
415 777-0250
FAX 415 495-5996

TESTIMONY OF
ALBERT H. MEYERHOFF
on behalf of the
Natural Resources Defense Council (NRDC)
and
RALPH SANTIAGO ABASCAL
on behalf of
California Rural Legal Assistance (CRLA)
before the
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON TOXIC SUBSTANCES,
ENVIRONMENTAL OVERSIGHT, RESEARCH AND DEVELOPMENT
UNITED STATES SENATE
Concerning the Implementation of
California's Proposition 65 and Its Contribution
to a Safer Workplace

July 5, 1989
Los Angeles, CA

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New York Office:
40 West 20th Street
New York, New York 10011
212 727-2700

Washington Office:
1350 New York Ave., N.W.
Washington, DC 20005
202 783-7800

Natural Resources
Defense Council
212 Merchant St.
Suite 203
Honolulu, HI 96813
808 533-1075

I am Albert H. Meyerhoff, Senior Attorney with the Natural Resources Defense Council (NRDC), a nonprofit organization of attorneys and scientists dedicated to protecting public health and the environment. NRDC, with other organizations, was instrumental in obtaining the passage of California's unique new toxics legislation, the Safe Drinking Water and Toxic Chemical Enforcement Act of 1986, commonly known as Proposition 65, adopted in 1986 by a two-to-one majority of the electorate. We have also brought several legal actions against California's Governor in order to ensure that this statute is properly implemented. With me this morning is Ralph Abascal, General Counsel with California Rural Legal Assistance, who is co-counsel in many of these cases.

General Background

In enacting Proposition 65, the people declared that they:

find that hazardous chemicals pose a serious potential threat to their health and wellbeing, that state government agencies have failed to provide them with adequate protection, and that these failures have been serious enough to lead to investigations by federal agencies of the administration of California's toxic protection programs. The people therefore declare their rights:...

(b) To be informed about exposures to chemicals that cause cancer, birth defects, or other reproductive harm.

(c) To secure strict enforcement of the laws controlling hazardous chemicals and deter actions that threaten public health and safety.

Proposition 65, Preamble, set forth as a note to California Health and Safety Code (hereafter "H&S"), Section 25249.5.

(NOTE: Attachments to this statement have been retained in committee files.)

To carry out the goals enumerated in its preamble, Proposition 65 requires, among other things, that "clear and reasonable warnings" be given prior to exposing individuals to known carcinogens or reproductive toxins that are subject to the statute's requirements. The Governor was required on or before March 2, 1987 to publish a "minimum list" of chemicals subject to Proposition 65 that "were known to the state" to cause cancer or reproductive toxicity. This list was then to be supplemented by additional chemicals that various "authoritative bodies" had otherwise classified as carcinogens or reproductive toxins as well as by chemicals so classified by a science panel selected by the Governor.

The Governor's list, issued on March 1, 1987, was to have included "at a minimum" those substances identified by reference in California Labor Code Section 6382(b)(1) and 6382(d). This code section incorporated any substance "listed as human or animal carcinogens by the International Agency for Research on Cancer (IARC), as well as any similar substance within the scope of the Federal Hazard Communication Standard (29. C.F.R. Section 1910.1200)." The Hazard Communication Standard includes within its purview both carcinogens that have been listed by IARC as well as all such substances listed as carcinogens by the National Toxicology Program and various carcinogens or reproductive toxins regulated as such by the United States Department of Labor.

For any chemical on this list, the clear and reasonable warning requirements of the statute become effective twelve months from the listing of the chemical in question.

Unfortunately, as discussed below, the history of Proposition 65 to date has been one of resistance rather than compliance by the Governor's office, resulting in lengthy delay in overall implementation of the statute, including the listing of chemicals subject to its remedial provisions. Thus, at the request of various regulated industries, in issuing his minimum list, the Governor ruled that the law applied only to a handful of chemicals actually known to cause cancer or birth defects in humans -- through studies of human populations -- a "count the bodies" approach. Rejecting settled scientific policy and the plain intent of the statute, the Governor declined to make subject to the law the far greater number of toxic chemicals that have been shown to cause these health effects in laboratory animals and that have thus been identified as "probable" human carcinogens or reproductive toxins. After a California Superior Court issued an injunction requiring the Governor to promulgate the appropriate "minimum list" of toxic chemicals, the Governor's Science Panel eventually listed most, but not all, of the 200-plus substances that were intended by the statute to be within its scope, including those that are classified as carcinogens or reproductive toxins by IARC, NTP or OSHA. Other listing requirements of the statute, including the one requiring other chemicals to be listed that have been classified as carcinogens

or reproductive toxins by other "authoritative bodies" (such as the Environmental Protection Agency or the California Department of Health Services) continue to be the subject of other legal action, brought by the AFL-CIO, NRDC, EDF and other organizations.

Overall, since its passage, Proposition 65 has been under a rather concerted attack by the Governor's office and various industries, resulting in "exemptions" from the law for a host of consumer products such as food, drugs, over-the-counter medicines and cosmetics and other loopholes from the drinking water provisions of the law ranging from pesticides to agricultural wastewater to leaking underground storage tanks. (A comprehensive analysis by the California Senate Office of Research of the many obstacles the Governor has seen fit to place in the way of this statute is attached to this testimony as Exhibit A.) Concerns have also been raised of potential conflicts of interest by members of the Governor's Scientific Advisory Panel, including the Chairman of the Panel, who was also the subject of a recent inquiry by this Subcommittee due to his activities while serving as Chairman of an Environmental Protection Agency Pesticide Science Advisory Panel. (See, "EPA Targets Governor's Science Aide in Ethics Probe," Los Angeles Times, May 18, 1989, part of Exhibit D, attached.) The Proposition 65 Panel Chairman and another Prop 65 Panel member with links to industry (who also serves on the EPA Science Advisory Board) both left the Panel last week. (See, "UC Davis

Professor Quits as Toxics Chief," Sacramento Bee, June 30, 1989, also attached as part of Exhibit D.)

Application of Proposition 65 in the California Workplace

The application of Proposition 65 in the workplace has similarly been rather checkered and subject to a cloud of legal uncertainty. In particular, the belated listing of various chemicals of particular concern in the workplace together with questions raised about federal preemption, discussed below, have combined to delay its immediate impact. However, potentially, Proposition 65 provides a path-breaking program for improvement in the working conditions of California's at least eleven million working women and men, particularly due to two of its most admirable provisions: the shifting of the burden of proof to the party responsible for exposure to affirmatively demonstrate that exposure to toxic chemicals is not hazardous and the creation of the means for direct citizen enforcement against such a party where dangerous levels of carcinogens or reproductive toxins have occurred in the workplace. Further, risk levels that are unlawful under Proposition 65 are, in many cases, orders of magnitude lower than those that have at least been claimed to be lawful under OSHA. The California Department of Health Services, in a paper presented at the 1989 Annual Meeting of the American Association for the Advancement of Science, said that:

[t]he Occupational Safety and Health Administration's newly proposed workplace standards allow workers to be exposed to carcinogens at levels that exceed the Proposition 65's 'no significant risk' levels,

typically by four orders of magnitude (range 30-550,000). California's Hazardous Substances Information and Training Act (California Labor Code §§ 6360-6399) requires that workers be warned about the cancer hazard of these exposures for only ten of the [first] 46 chemicals [on the Governor's list].

See, Zeise, Pease, and Kelter, "Risk Assessment for Carcinogens under California's Proposition 65," p. 7, attached hereto as Exhibit B.

Finally, numerous chemicals (particularly reproductive toxins) that are not necessarily within the OSHA standard, are now and in the future likely to become subject to Proposition 65's "clear and reasonable" warning requirements.

Under Proposition 65's statutory scheme, a clear and reasonable warning must be provided whenever there is exposure to any level of a listed carcinogen or reproductive toxin unless and only if the party responsible for that exposure can show, by affirmative evidence, that lifetime exposure at the level in question will not create a "significant risk" of cancer or reproductive harm, assuming lifetime exposure at the level in question. H&S Section 25249.6. A significant risk of cancer has been defined by the Governor to mean a risk greater than one additional cancer in the population for each 100,000 persons exposed (permitting at least one order of magnitude greater risk than traditionally used by various federal and state agencies or as that term is generally understood within the scientific community). The statute itself defines significant risk of birth defects, authorizing exposure at levels no greater than 1/1,000

of the level that creates an "observable effect" in laboratory animals.

Most critically, the party responsible for exposure can obtain an exception from the warning requirements only if he or she can demonstrate through valid, qualitative risk assessments meeting detailed standards set forth by regulation that no such risk is created. Absent such risk assessment and affirmative evidence, a warning is mandated. The use of boilerplate MSDS sheets to provide these warnings is probably legally insufficient and, by regulation, is permissible only where the required "clear and reasonable warning" is actually conveyed through that process. Whether MSDS sheets have achieved the warning required by the statute would thus be a question of fact, on a case-by-case basis, to be determined by the jury or trier of fact.

Enforcement of Proposition 65 is triggered by an appropriate 60-day notice, to be filed with various law enforcement officials including the Attorney General or applicable District Attorney. Where such enforcement is not brought, private individuals are then authorized to file suit and seek appropriate relief as "private attorneys general." Penalties of up to \$2500 per day per person exposed unlawfully are authorized, with 25 percent of such penalties being returned to the private litigant. This shifting of the burden of proof and incentive for private enforcement are the dual linchpins of Proposition 65. Given the sorry record of both California and federal enforcement of various worker health and safety statutes, Proposition 65's

potential for thus establishing a true, enforceable "right to know" in California is both clear and dramatic.

Unfortunately, the promise of Proposition 65 in the workplace has so far been mostly that -- a promise, not yet a reality. Numerous chemicals are only now coming within the scope of Proposition 65 protections due to the Governor's previous foot dragging. And the application of Proposition 65 in the workplace has been the subject of a legal attack by the chemical industry, seeking to preempt the law.

Ongoing Attempts to Preempt Proposition 65

As this subcommittee is aware, the federal OSHA act, 29 U.S.C. Section 667, provides that when a federal OSHA standard has been issued with respect to any issue under the federal act, a state may regulate with respect to that issue if it is has incorporated the state law into the state OSHA plan. However, failure to amend the state OSHA plan may subject such a state law to the possibility of preemption by Section 18 of the federal act. See United Steel Workers of America v. Auchter, 763 F.2d 728, 733-34 (3d Cir. 1985). An action is now pending in the United States District Court for the Eastern District of California which seeks precisely that for Proposition 65, to preempt the statute's clear and reasonable warning requirements. (Chemical Manufacturers' Association, Chemical Industry Counsel of California v. California Health and Welfare Agency, Civ. No. 88-1615-LKK).

On behalf of the California Labor Federation, AFL-CIO and several other groups including the Natural Resources Defense Council, we submitted a petition to the Department of Industrial Relations through its Occupational Safety and Health Standards Board requesting that it generally make Proposition 65 warning requirements a part of California state OSHA plan. The chief of the Occupational Safety and Health Division of DIR, R. W. Strandberg, indicated in his preliminary review that "the arguments of the petition appear to have some validity..." and the staff recommended that the petition be granted by the Standards Board, with certain highly questionable modifications. (Attached as Exhibit C is a copy of the proposed rejected staff decision.) However, rejecting the advice of their staff, the Occupational Health and Safety Standards Board of the Department of Industrial Relations has just voted 4-1 to deny the petition entirely. Additional litigation is therefore likely to contest the unfortunate continuing efforts of the Deukmejian Administration to thwart implementation of this reform statute.

In order to fully understand the current status of Proposition 65 in the workplace in California, it is necessary first to briefly review recent developments involving Cal/OSHA which has also been under attack for some time by the California Governor. In July 1987, the Governor reduced the appropriation in the Budget Act of 1987 for the Department of Industrial Relations and directed the Department to cease all enforcement of the state OSHA plan in the private sector. The Department did

so, but its actions were held invalid in Ixta v. Rinaldo (1987) 195 Cal.App.3d 886. The California Supreme Court then granted review of that decision. However, while the matter was still pending before the Supreme Court, an initiative measure, Proposition 97 was placed upon the November 8, 1988 ballot for the purpose of restoring the state OSHA plan. Proposition 97 was adopted by the electorate on November 8, 1988, and the people of California, once again, indicated their intention that the workplace be safe and secure, including through the protections of Proposition 65.

Indeed, Proposition 97 specified that "the state plan shall be consistent with the provisions of state law governing occupational safety and health,..." Proposition 65 constitutes a "state law governing occupational safety and health" and, therefore, pursuant to its complementary Proposition 97, was intended to be made part of California's overall Occupational Health and Safety State Plan. The failure to include Proposition 65 within the State OSHA Plan flies directly in the face of the preamble to Proposition 97:

It is the purpose of this Act to restore California control over private sector safety and health, which the state has provided since 1913 and has administered since 1973 through Cal/OSHA. Pursuant to Article XIV, Section 4, of the California Constitution state jurisdiction over worker safety and health should not be limited, eliminated, or otherwise restricted, unless absolutely required by the Federal Constitution." (emphasis added.) Clearly, as the proposed decision of the California OSHA Standards Board demonstrates, it is possible to add Proposition 65's provisions to the State Plan and thereby avoid preemption as the foregoing preamble directs.

By declining to specifically include Proposition 65's plenary requirements in the State Plan, the Governor is simply refusing to obey the express will of the public, shown now in two separate votes by a sizeable margin. As a result, the fundamental purpose of Proposition 65 -- to ensure that workers and all Californians be informed about exposures to chemicals that cause cancer, birth defects, and other reproductive harm -- remains threatened and the application of Proposition 65 in the workplace remains in limbo.

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